NINETY-EIGHTH YEAR

AMERICAN Gas Journal

JUNE, 1957

Only Magazine Published Exclusively for the Gas Utility Industry

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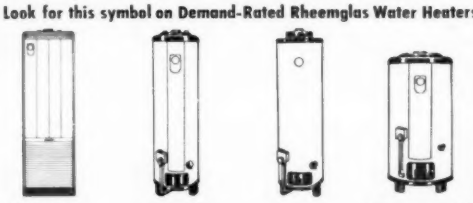

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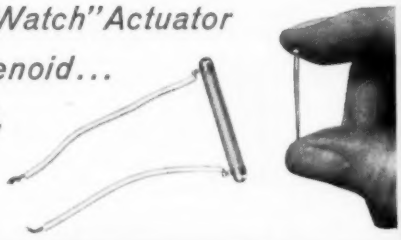

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Memo From The Editors

Fuel for Thought

LET'S CONSIDER THE CASE OF MR. AVERAGE CITIZEN, otherwise known here as John Doe, and how the gas utility industry might best use his good judgment (and his voice in the various levels of government) to improve its relations with the public in matters of public regulation.

Mr. Doe, in a typical case, bought a house in 1940, and paid $8000 for it. It's a nice home, well built, with shady trees and in a good location. Mr. John Doe had an offer for his house the other day — a prospect offered $17,000 for it.

Now Mr. Doe doesn't want to sell his house, but if he did, he would probably agree that $17,000 would be a fair price, based on replacement costs that consider the price of materials and labor in effect in 1957.

If Mr. Doe were to be told by a regulatory body of his local, county, state — or even the federal — government that he couldn't dispose of his property for more than the original $8000 less depreciation, you can bet he would scream "Robbery!" and be justified in doing so.

In defense of his stand that the house is worth $17,000 on today's market, he would no doubt refer to the cost of making a replacement.

But, since Mr. Doe already has a house, why replace it or even consider the cost of replacement?

Sounds like a dilemma in the making, doesn't it? Yet that's the same problem facing many utilities today — in different form of course — when they go before regulatory bodies of local, state, and federal government.

The same men who sit on these commissions or boards or whatever name they are given — and the same men who spell out the legislation whereby they make their decisions — and the same men who sit at the bar of "justice" dispensing court opinions would think it grossly unfair if replacement cost ("appreciation" is a better term) were not considered if they were selling their house.

Yet when a rate case for a utility is laid before them, more often than not the subject of "appreciation" or replacement cost is struck from consideration.

Is there something "evil" about the appreciation of value of a utility's physical plant, while the same factor applied to personal property or residential real estate is "good"?

We have noted in reading reports from all points of the nation's compass an increasing tendency by governmental bodies toward "protection of the public interest." This "protection" takes its form in adverse legislation or regulatory decisions towards public utilities.

If proper rates to insure continuing growth and improved service by public utilities is not one of the best forms of protecting the public interest, then our age-old American concept of free, competitive enterprise should be abandoned for some other political philosophy.

And none of us want that.

These principles of reasonable replacement cost, reasonable value for a product, and reasonable return on investment must be applied across the board.

Rates for gas purchased in the field should be based on a reasonable market value, with all factors considered, not just actual cost.

Transportation costs, over and above actual gas costs, for pipeline companies should be determined on a similar basis.

To eventually achieve this more satisfactory state, the gas industry is going to have to work harder in its efforts to foster a good "public relationship." By this we mean that our industry is going to have to explain, in terms that Mr. John Doe and his family can understand, that its business finances are quite similar to those of an average American family.

For instance: If Mr. Doe buys something "on time," he pays interest on the unpaid balance of his obligation — and pays it because someone else put up the money to cover the item's cost until Mr. Doe has paid for the item in full. Utilities do the same thing — the difference being that they borrow the money actually needed.

Mr. Doe and family buy a new car and appliances of various types at reasonable intervals because the car they have and the appliances "wear out." So do the materials and equipment used by the utilities. The auto that Mr. Doe bought three years ago couldn't be replaced with a 1957 model at the same price he paid for his 1954 model. Nor can the utilities replace equipment at old prices.

Mr. Doe works — and he expects his salary or wages to be at current levels. He wouldn't work for a salary or wages at the level of last year, or five years ago, or 15 years ago. Why, then, should he expect the utility to do so?

Everything Mr. Doe buys today costs more than it did 1, 5, 10 or 15 years ago. He takes it for granted. Unless, of course, it is a service or product provided by a public utility.

Education of the public served by the gas (and other) utilities must be a continuing thing. People are entering our economy at a growing rate every day, establishing new homes, becoming customers of the utilities.

It is urgently important that they be helped in their economic education through a never-ending, high-level public relations program.

The cat-and-dog fighting we have witnessed in the past few years hasn't helped. Signs that it may erupt again can be seen in many legislative chambers including Washington, and in the courts and hearing rooms of numerous regulatory agencies.

Public relations activities of many utilities in the past, to be frank, have been terrifically bad. They are greatly improved today, to be sure, but this improvement must continue. And, it will require teamwork by all segments of our industry, working towards a common goal of providing the public with the best possible product at a reasonable cost of service.

In This Issue . . .

If disaster struck in your area — flood, tornado, hurricane, major fire, earthquake — would *your* company be prepared? If you're not sure, you might take notes on the experiences of Connecticut Light and Power Company in the great floods of 1955. And, particularly, what they have done since that time to be prepared for any type of emergency that would threaten operation of their gas distribution systems . . . details on page 22.

Is your customer service department a bottleneck in your ever-expanding operations? Yes or no, there are probably many ways it can be streamlined to expedite service requests, bill payment, and the many other and sundry duties expected of it. Mechanization (not automation, mind you, because service *means* people) might be the answer. Find out how it has helped Lone Star Gas speed its operations in rapidly growing Dallas . . . page 18.

Like gimmicks? We've rounded up four top-drawer ideas that not only improve the safety of your operations, but speed 'em up, too! They're practical and inexpensive . . . and you'll be surprised how handy they are . . . page 34.

American Gas Journal

Established July 1, 1859

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NINETY-EIGHTH YEAR

AMERICAN Gas Journal

GAS TECHNOLOGY — OPERATIONS — EQUIPMENT — MANAGEMENT — UTILIZATION

VOLUME 184 **June, 1957** Number 6

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Natural gas common stock prices reached an all-time high in April, with a price index of $42.94 per share, a year-to-year gain of 16.4 percent. Dividends of $1.91 per share were 9.8 percent above April, 1956, and returned a yield of nearly 4.5 percent, reported the AGA.

If you don't think our free enterprise system is better, read on . . . the following wire story originated in England. . . .

LONDON — *W. B. Wilkinson reported bitterly today that it took a total of 25 men with trucks and equipment to install one gas stove in his shop.*

When he asked for the new stove, Wilkinson said, an inspector called and agreed. Next, two men delivered the new stove. Two more came the following day to install it. Two more arrived to take the old stove away.

Meanwhile, the two men installing the new stove decided a new meter was needed. A man arrived with the new meter. Two more men arrived to connect it. Another man came to take the old meter away.

Someone then decided that the gas pipes needed blowing out. That required three more men with a truck and compressor unit. They decided the stoppage was not in the building and called for two more inspectors. Then a truck arrived with six more men, picks, compressors, and shovels, and began digging up the street.

When the new section of pipe was finally installed, another man was sent out to paint it.

Anybody for more bureaucracy?

"Super suburbia" may be just around the corner, Federal Housing Administrator Albert M. Cole told the 26th annual LPGA meeting in Chicago in mid-May. He painted a picture of a vast ring of suburbs around most metropolitan areas, with city-bound commuters using helicopters or the "super highway" system being created by the new federal-state highway fund program. Cole's remarks were cited as a reason for continuing development of the gas unity program in which utilities and LP-Gas dealers team up to create new markets for gas.

Bankruptcy for one of the nation's major gas transmission companies may come if a hearing examiner's decision in its rate cases is not radically changed, W. E. Mueller, president of Colorado Interstate Gas Company has charged. He noted that under the rates authorized by examiner Samuel Binder, CIG would not have earned any dividend on its common stock in its 1956 operations and would have failed to earn any preferred dividend and also would have failed to earn a substantial portion of the interest on its bonded debt. Mueller noted that CIG's expansion program for the Rocky Mountain area would be shut down immediately unless short-term financing could be arranged, awaiting further FPC action.

Regulatory Briefs. *Iowa's* Supreme Court is hearing a case involving Iowa-Illinois Gas & Electric and the city of Fort Dodge that may result in an influential—if not controlling — decision in the determination of pending and potential utility rate cases in the state for years to come. Chief issue involved is whether a utility's original cost or the replacement cost should be used as a rate base . . . In *Maine*, a bill that would make "net prudent investment" the basis for valuing public utility property for rate-making purposes was passed by the Maine House of Representatives and sent to the state senate. The bill would have the effect of deleting "current value" of property as a factor in determining a rate base . . . *Michigan's* legislature has passed and sent to the governor for signature a bill that would permit utilities to condemn property below the so-called Marshall formation, a strata that lies some 1350 ft underground, for use in gas storage. Michigan law previously forbid gas storage below that level . . . Bills that would provide for reimbursement to utilities for moving their facilities when necessitated by construction of interstate highways have been passed recently in the states of *Minnesota, New Mexico, Rhode Island,* and *Vermont*. Similar bill in *Maine* has passed the state senate, sent to the house. In *Colorado,* Governor McNichols vetoed a similar bill . . . In *Vermont,* the state senate defeated a bill that would have prohibited public utility companies from retailing appliances. A senate committee said it found no evidence that utilities were subsidizing their retail activities through gas and power rates.

Gas househeating customers will reach 20,500,000 by the end of 1959, predicts the AGA. They represent 60 percent of all residential gas consumers and 71 percent of all residential users considered to be part of the potential gas househeating market. The gas utility industry added an estimated 1,300,000 consumers during the 1956-57 heating season, and increased its total of gas househeating customers to 16,700,000 for an 8½ percent gain over the previous year. Existing dwelling units, through conversion from other types of fuel, will account for almost 40 percent of the additional 3,700,000 new gas customers expected to be added during the next three heating seasons.

Sudden Thought: If your government is big enough to give you everything you want, it is big enough to take away everything you have!

Record expenditures for construction, totaling $13,200,000, will be made in 1957 by Brooklyn Union Gas Company for new and expanded facilities to meet increasing demand for gas. Some $2,200,000 will be spent in the newly-acquired Staten Island area alone, according to company president John E. Heyke.

Contracts for future construction in the U. S. were up sharply in March, compared to the same month last year, reports F. W. Dodge Corporation, construction news and marketing specialists. The total of $3,077,997,000 in March was an 11 percent gain. The increase in total construction contracts came in spite of a decline in the residential category, which was down 7 percent for the comparable period of 1956 for the second straight month.

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The all new Sherman can be dismounted in

Arc of Swing: 188°, Uninterrupted
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Stabilizer Spread: 8′
Reach Below Grade: 12′
Reach from Axle at Grade: 18′
Length of Excavation from One Tractor Position: 15′ 8″
Rear Axle to Center Line of Swing Post: 38″
Shovel Clearance Height: 9′ 2″
Shovel Teeth Clearance Height Fully Dumped: 12′ 6″
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SHERMAN

a **few minutes** by simply removing six pins and four bolts.

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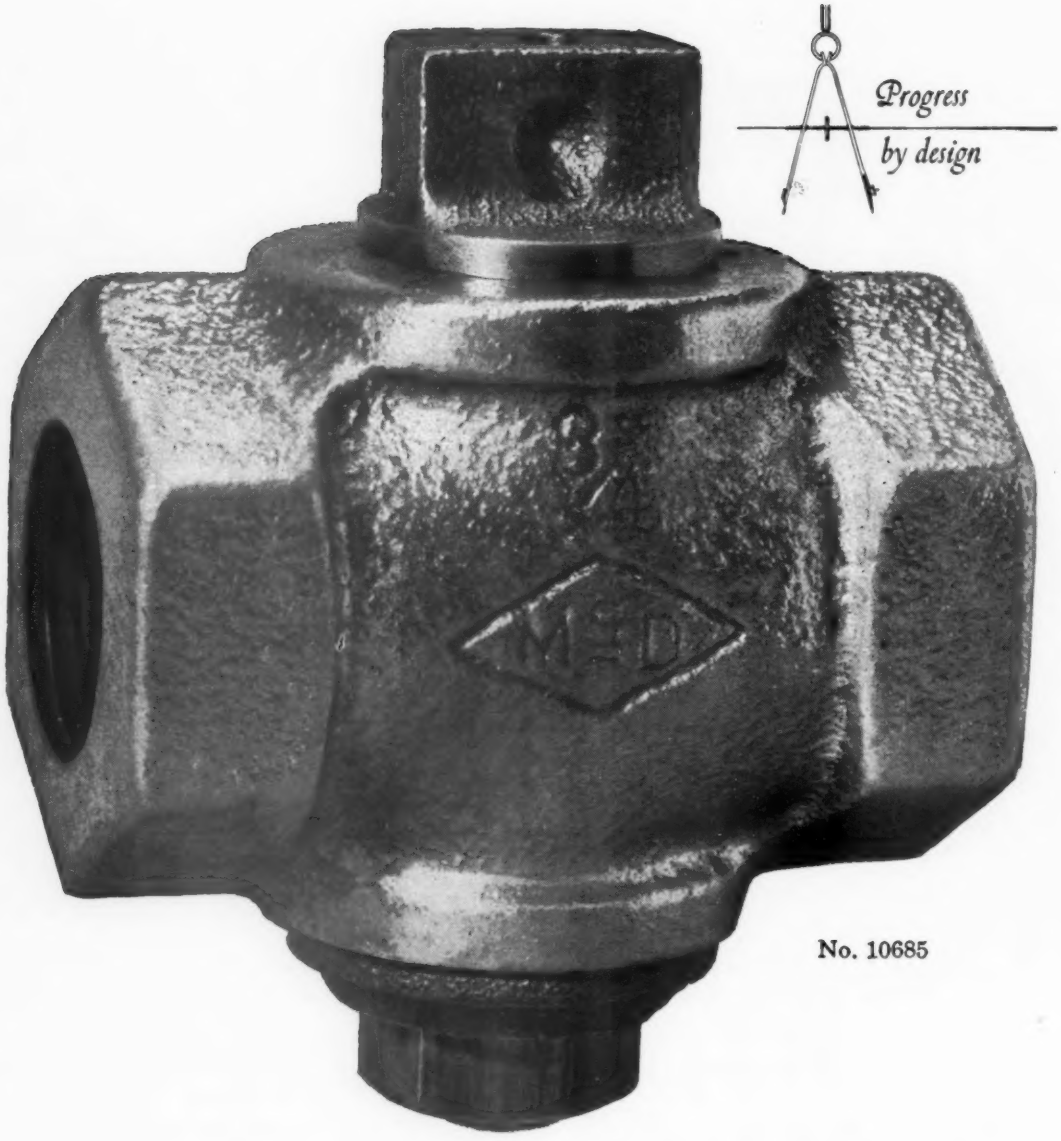

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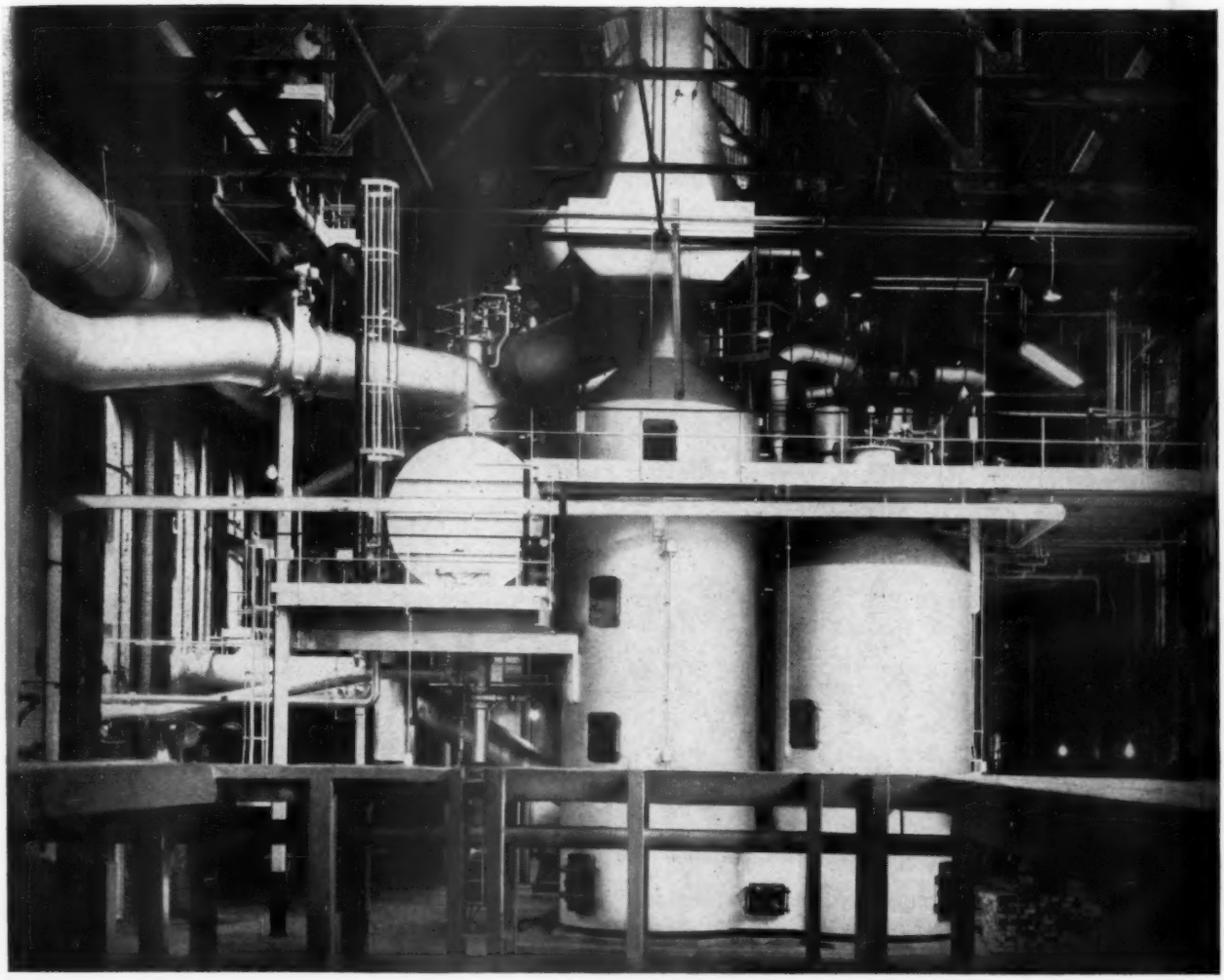

U.G.I. 13 ft. Oil Gas Apparatus, located at Station "A" Plant, Philadelphia Gas Works Division of The United Gas Improvement Company.

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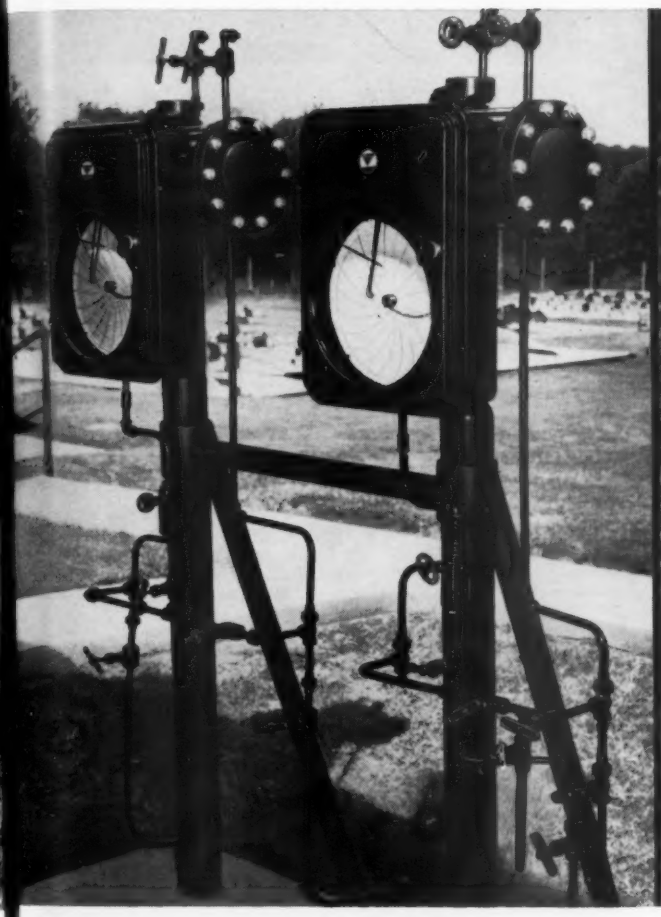

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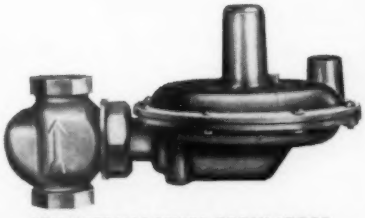

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AMERICAN WELDED STEELCASE METERS assure new economies in displacement meter measurement.

AMERICAN METER COMPANY
INCORPORATED (ESTABLISHED 1836)

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SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters • Instruments • Reliance Regulators • Apparatus • Valves

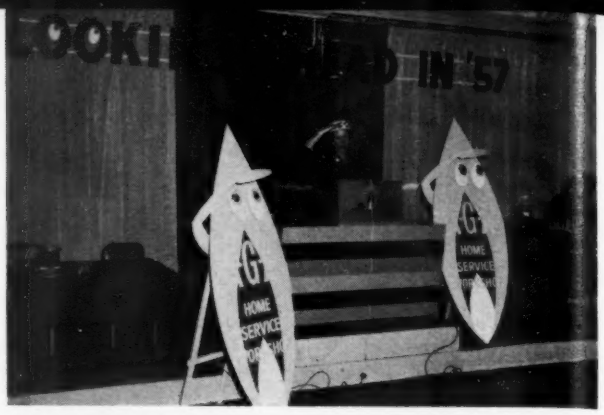
Mcf PICTORIAL PAGE

NEWS-VIEWS OF THE GAS UTILITY INDUSTRY

Panel members check appliance dealer relationships at the PCGA Spring Sales Conference held at Seattle. Left to right are Don Burdick, Southern Counties Gas Company; Clarence Weaver, Cascade Natural Gas Company; Ian McDonald, B. C. Electric Company; Jim Bird, Washington Natural Gas Company, and Bud Shaff, Arizona Public Service Company.

Distinguished service award was given Frank Osborne, right, general manager of Mission Appliance Corporation, Hawthorne, California, at recent GAMA annual meeting. Award was presented by GAMA president Julius Klein in recognition of Osborne's achievements as chairman of GAMA's water heater division.

Speakers at AGA General Management Section annual meeting at Edgewater Park, Mississippi, included Alexander M. Beebee, chairman of the board, Rochester Gas & Electric Corporation (left) and Ira H. Cram, senior vice president, Continental Oil Company, Houston (right). Greeting them was J. H. Wimberly, center, president of Houston Natural Gas Company and Vice chairman of the AGA General Management Committee.



Marjorie Chandler, of The Consumers' Gas Company of Toronto and chairman of AGA Home Service Committee, opens the 1957 Home Service Workshop held in Toronto. Theme of the program was "Looking Ahead in '57."

New officers of Indiana Gas Association, elected at the 47th annual convention at French Lick, Indiana, are, left to right, V. C. Seiter, controller, Citizens Gas & Coke Utility, Indianapolis, vice president; Lyman H. Bell, president, Hoosier Gas Corporation, Vincennes, new president, and R. A. Steele, internal auditor, Citizens Gas & Coke Utility, secretary-treasurer.

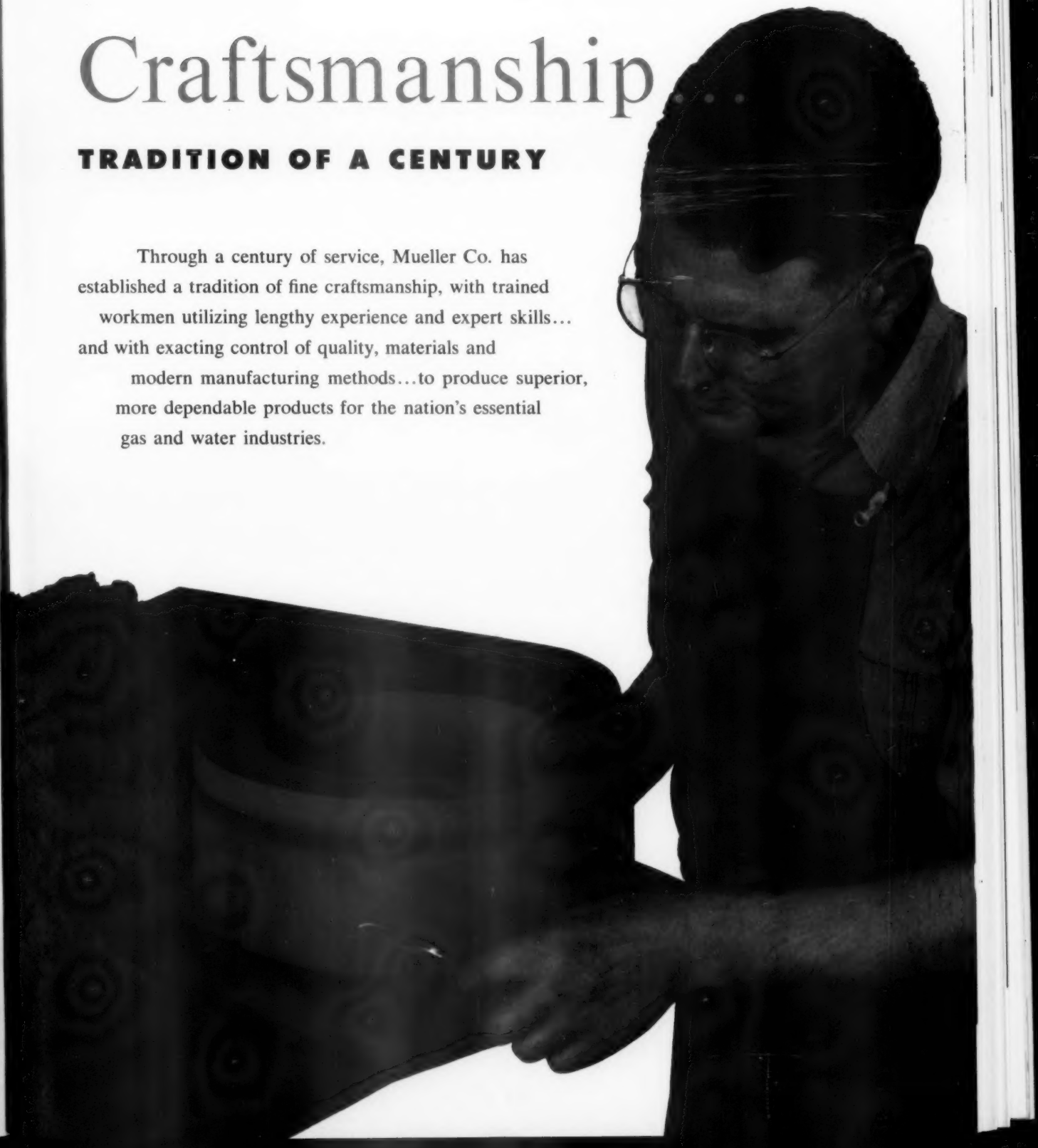
Awards for top performance in GAMA-PEP prize contest were made at the annual AGA Industrial and Commercial Gas Section meeting, held this year in New Orleans. The awards were presented, left to right, to Piedmont Natural Gas Company, Inc., Charlotte, North Carolina, represented by J. J. Sheehan; Laclede Gas Company, St. Louis, John J. McKearin; and Framingham Division of the Worcester (Massachusetts) Gas Light Company, James Buckley.

GAMA officials gather for board of directors meeting at the 22nd annual meeting of the group at White Sulphur Springs, West Virginia. Left to right are Clifford Coons, executive vice president, Rheem Manufacturing Company and newly elected president of GAMA; H. Leigh Whitelaw, GAMA executive vice president; Stanley H. Hobson, president, Geo. D. Roper Corporation and GAMA treasurer; and Wendell C. Davis, president, Cribben & Sexton, newly elected second vice president of GAMA.

Craftsmanship

TRADITION OF A CENTURY

Through a century of service, Mueller Co. has established a tradition of fine craftsmanship, with trained workmen utilizing lengthy experience and expert skills... and with exacting control of quality, materials and modern manufacturing methods...to produce superior, more dependable products for the nation's essential gas and water industries.



Constant temperature checks assure foundrymen that molten metal, which can be accurately maintained within a plus or minus of 10 degrees Fahrenheit, is of the exact heat and proper consistency.

Expert core men, with skilled hands, call on experience, craftsmanship and unerring skill to shape cores with exacting detail, even to the grain of the sand.

Patience...

Pride...

Perfection...

Patterns are shaped and inspected in minute detail to assure exact accuracy and precision. Records of many thousands of patterns and core boxes are maintained in the Pattern Shop for checking purposes.

Nimble fingers of this master craftsman operate a ground key lapping machine, producing Mueller stops that must have accuracy to .001 of an inch.

Testing the alignment of plates used for making brass and iron castings. Accuracy to .001 of an inch is strictly maintained for perfect molds.

Experienced ladlemen jockey ladles into position to receive white-hot liquid brass. Furnaces melt 2,000 pounds of brass in an hour.

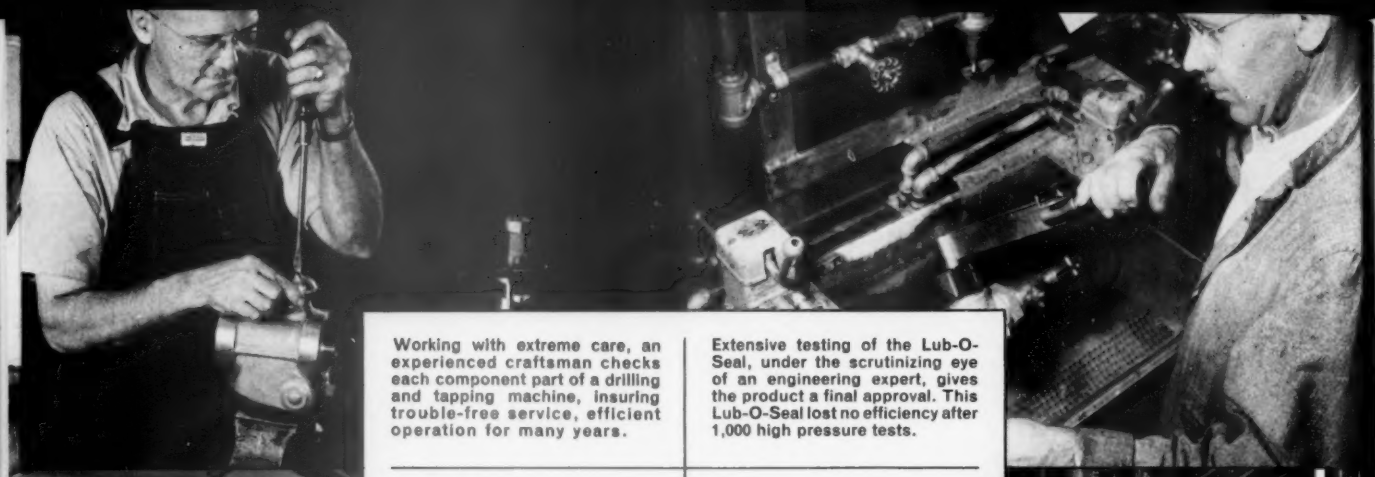
Modern tools are of the utmos importance in fabricating an ex tension stopper fitting whic must be accurate for long-livec ease of operation.

Precision machines cutting gleaming metal to microscopic tolerances... turning conveyor lines carefully carrying partially completed products to assembly points... busy men of many talents adjusting instruments, reading gauges, skilfully performing their work—this is Mueller quality in the making!

Within this vast array of men and machines, every movement has a purpose... each and every man is thoroughly trained for his work, takes great pride in carrying it to perfection. Each part is carefully examined and tested to insure a product of highest quality and the finest workmanship possible... a product that will give long, safe and trouble-free service.

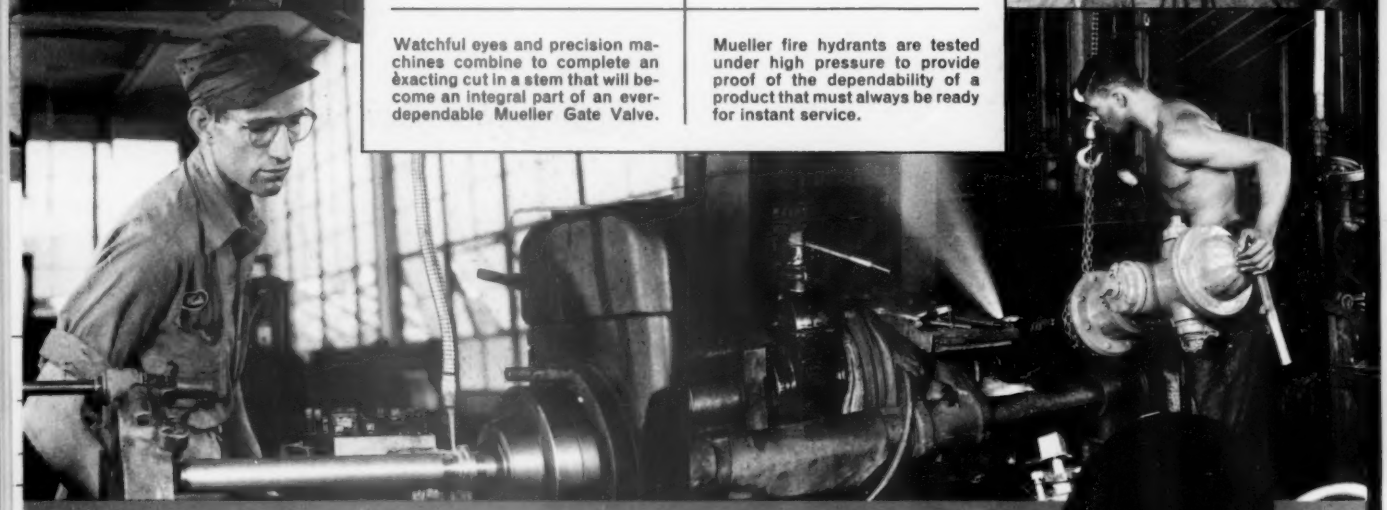
Never-ending patience and great pride in his work guide this machinist as he manufactures thousands of small parts used in Mueller products.

A skilled workman with a steady hand and a "fire-proof" thumb "wipes" a lead gooseneck joint to mirror-smooth perfection.



Working with extreme care, an experienced craftsman checks each component part of a drilling and tapping machine, insuring trouble-free service, efficient operation for many years.

Extensive testing of the Lub-O-Seal, under the scrutinizing eye of an engineering expert, gives the product a final approval. This Lub-O-Seal lost no efficiency after 1,000 high pressure tests.



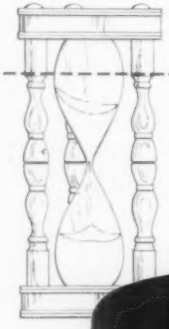
Watchful eyes and precision machines combine to complete an exacting cut in a stem that will become an integral part of an ever-dependable Mueller Gate Valve.

Mueller fire hydrants are tested under high pressure to provide proof of the dependability of a product that must always be ready for instant service.

The final test . . .

When the finished unit leaves Mueller Co., the skill, the care and the quality built into each product must meet one final test . . . a test in which Mueller products have demonstrated superior quality time and time again.

This is the test of the product on the job . . . in the line to stay, giving dependable, efficient, long-lasting service . . . a test which proves that the century-old, Mueller tradition of craftsmanship is worthwhile.



MUELLER CO. **DECATUR, ILL.**

Factories at: Decatur, Chattanooga, Los Angeles;
In Canada: Mueller, Limited, Sarnia, Ontario

MUELLER CO. 100th YEAR SERVING the Water and Gas Industries QUALITY

Since 1857

Make Dependable Gas Service Connections

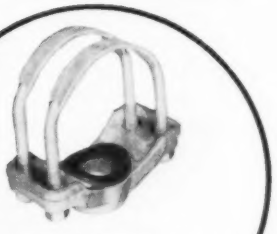
FAST... with DRESSER SERVICE SADDLES

HEAVIER DESIGN — Bodies are ruggedly constructed from Grade A malleable iron with reinforced sections for extra strength.

FULL TAPPING RANGE — Available with IPS Thread taps to 2" in size. Extra large boss insures obtaining full threads.

EXTRA-WIDE, FLAT STEEL STRAPS — Forged, high-tensile steel straps are accurately shaped to conform to the outside of the pipe. Wide, flat surfaces prevent cutting or crushing of pipe.

FIT FULL RANGE OF PIPE — Dresser Service Saddles fit steel or cast-iron pipe where the OD falls within the size range marked clearly on each saddle.



Gasket of Dresser Grade 27 compound is securely cemented in place for easy installation.

Dresser Service Saddles are available in single or double strap designs.

For service connections that go in fast and easy, and give generations of dependable service, it pays to use Dresser Service Saddles. In a matter of minutes you can install a Dresser Service Saddle on steel or cast-iron pipe. The gasket of Dresser Grade 27 compound is already cemented firmly in place to make installation still easier. Saddles have exclusive plastic coating which won't "plate-out," has dielectric strength. Saddles are available in a complete range of sizes to give a "tailor-made" fit on any line from 1¼" OD to 15" OD. The original cost is low, and Dresser's high standards of strength and quality insure lasting performance.

FOR FURTHER INFORMATION write for your free copy of the illustrated folder *Dresser Service Saddles, Style 91.*

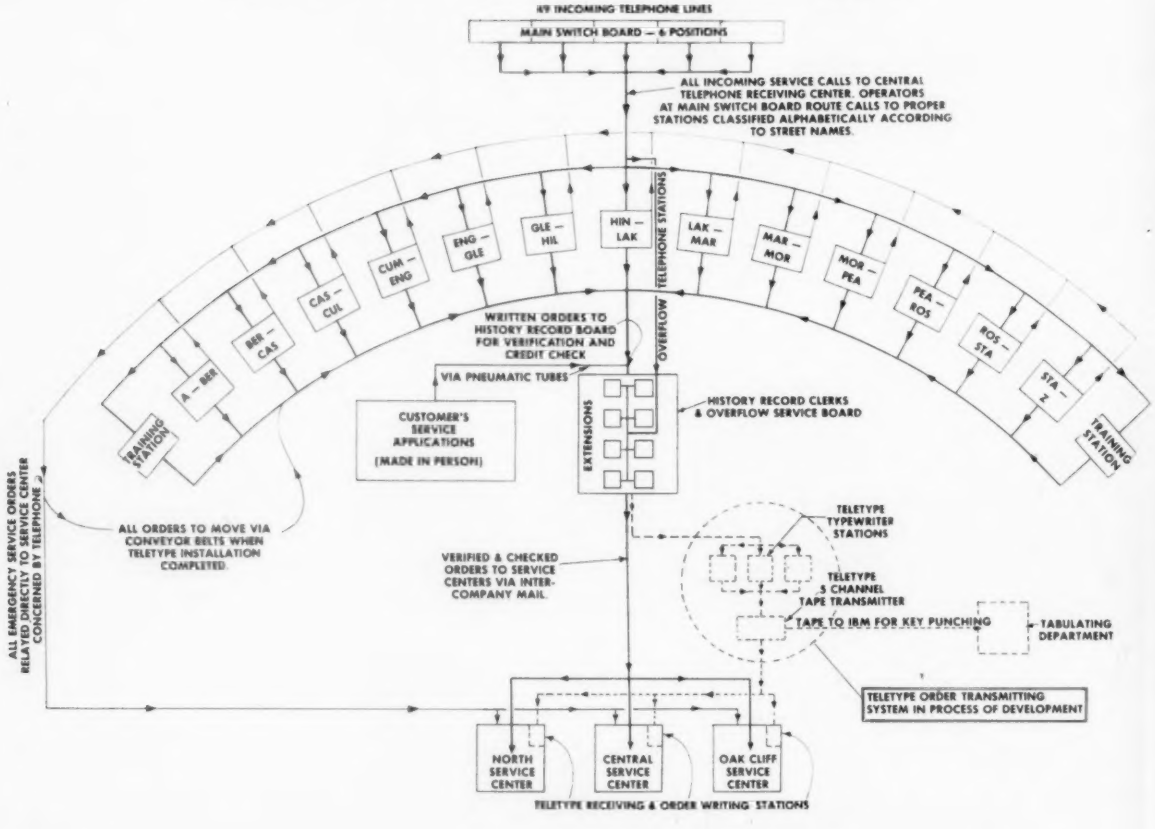
DRESSER®

ONE OF THE DRESSER INDUSTRIES

Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. Warehouses: 1121 Rothwell St., Houston; 101 S. Airport Blvd., S. San Francisco. Sales Offices in: New York, Philadelphia, Chicago, Atlanta, Denver. In Canada: Toronto and Calgary.

Telephone service section, "nerve center" of company's service operations, has been redesigned in horseshoe shape to speed call handling. Each operator has access to 25,000 current account records without leaving desk. History files are in center and a total of 1,500,000 records are located in this area employing staff of 43 people. From here, service orders are eventually transmitted to shops by teletype.

CUSTOMER SERVICE FLOW CHART


49 INCOMING TELEPHONE LINES
MAIN SWITCH BOARD — 6 POSITIONS
ALL INCOMING SERVICE CALLS TO CENTRAL TELEPHONE RECEIVING CENTER. OPERATORS AT MAIN SWITCH BOARD ROUTE CALLS TO PROPER STATIONS CLASSIFIED ALPHABETICALLY ACCORDING TO STREET NAMES.
TELEPHONE STATIONS
TRAINING STATION
A — BER
BER — CAS
CAS — CUL
CUM — ENG
ENG — GLE
GLE — HIL
HIN — LAK
LAK — MAR
MAR — MOR
MOR — PEA
PEA — ROS
ROS — STA
STA — Z
TRAINING STATION
OVERFLOW
WRITTEN ORDERS TO HISTORY RECORD BOARD FOR VERIFICATION AND CREDIT CHECK
VIA PNEUMATIC TUBES
CUSTOMER'S SERVICE APPLICATIONS (MADE IN PERSON)
EXTENSIONS
HISTORY RECORD CLERKS & OVERFLOW SERVICE BOARD
ALL EMERGENCY SERVICE ORDERS RELAYED DIRECTLY TO SERVICE CENTER CONCERNED BY TELEPHONE
ALL ORDERS TO MOVE VIA CONVEYOR BELTS WHEN TELETYPE INSTALLATION COMPLETED.
VERIFIED & CHECKED ORDERS TO SERVICE CENTERS VIA INTER-COMPANY MAIL.
TELETYPE TYPEWRITER STATIONS
TELETYPE 5 CHANNEL TAPE TRANSMITTER
TAPE TO IBM FOR KEY PUNCHING
TABULATING DEPARTMENT
TELETYPE ORDER TRANSMITTING SYSTEM IN PROCESS OF DEVELOPMENT
NORTH SERVICE CENTER
CENTRAL SERVICE CENTER
OAK CLIFF SERVICE CENTER
TELETYPE RECEIVING & ORDER WRITING STATIONS

Dallas Passes 200,000th Customer Goal

Mechanized Methods Streamline Customer Service Department

Customer service section on main floor has been redesigned for increased efficiency and speed in handling direct customer contacts. Behind counters at right and in background are new desks or "stations" where newly trained personnel can handle a variety of service requests. Departmental signs such as "Duplicate Bills," "Applications," etc., will be removed as soon as new signs are delivered. Cashier section is on the left, out of the picture. Direct telephone and conveyor system connects first floor with record sections on other floors. Information secretary has been moved into this area to assist in speeding public contact handling.

IBM section moved from crowded second floor to fourth floor quarters allows for future growth and has aided in increasing efficiency.

ON March 28, of this year, Lone Star Gas Company set a gold meter for its 200,000th customer in the Dallas metropolitan area. The date was a milestone for Dallas distribution operations, which currently account for 25 percent of the total customers served by the Lone Star system.

During the past 10 years, Dallas population figures have doubled. So have Lone Star operations in the area. with no slowdown in sight, company officials are looking ahead with a continuing program of expansion to physical properties and additional streamlining of customer service methods.

In the next 20 years, say the experts, Dallas could well be the "home town" for 1,500,000 people. To meet the gas service requirements of such a city, an automated system of operations will be essential.

For example, office handling of interdepartmental records is in the process of being highly mechanized by the use of automatic conveyor systems and teletype machines, the latter for transmitting service orders to the shop dispatchers.

A great simplification of basic requirements from customers is already being put into effect. It will take another year or more to make the complete transition.

Time Is Money

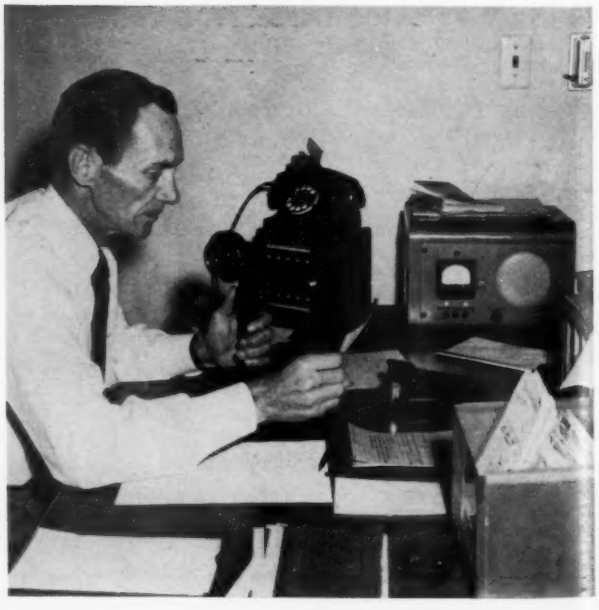
The saving in time of even so much as one-half minute per contact, when handling the service problems of 200,000 customers, is of vital importance in an accelerated operating program.

Streamlining of operations began several years ago and includes the decentralizing of service facilities into three zones within the Greater Dallas area. Early in 1950 a North Dallas service center was put into operation. In 1952 an Oak Cliff service center was opened and this year the old, original service center, built in 1923, is being replaced with a new, modern Central service center to serve Central and South Dallas.

Mail room facilities at Lone Star Gas Company's Dallas offices include direct mail chute to first floor cashier department. Mail is automatically opened, bundled with rubber bands and tubed to cashier mail teller in one-third former time because of new central location of mail room.

Receiving table in cashier department gets continuous flow of bill payments through new mail chute. When bill payments are processed, stubs are sent through pneumatic tube system to IBM. Automated mail handling has helped to keep accounts current and avoid customer inconvenience.

Drive-up windows are boon to Lone Star customers in many areas where new offices have been built. In Dallas, new Oak Cliff office receives an estimated 1300 to 1500 bill payments monthly at drive-up window. Starting out receiving about one-third of payments at window, number using this convenience has now increased to almost one-half of total customers served by the Oak Cliff office.



General foreman at Lone Star's North service center radios order to one of numerous radio-equipped fleet units. Routine and emergency orders can be given prompt attention when cars "in service" can be located and contacted on a moment's notice. Lone Star has 83 units of Dallas fleet radio equipped. There are two base stations and two additional transmitting points in the operation.

The continuing program has also established an almost complete circle of city gate stations around Dallas, bringing gas into the distribution system from major carriers tapping fields in East and West Texas and South Central Oklahoma. Six of these are major gate stations and six are smaller district stations.

Eighty-three radio-controlled service and construction fleet units provide a basic link in the framework of fast, dependable service for the growing city. Two base stations, KKI-820 and KKE-815, are located at North and Oak Cliff service centers with additional transmitters connected by telephone from both the street department headquarters downtown and Central service center. Any one of the fleet units, or a multiple number of them in case of emergency, may be contacted in a matter of seconds.

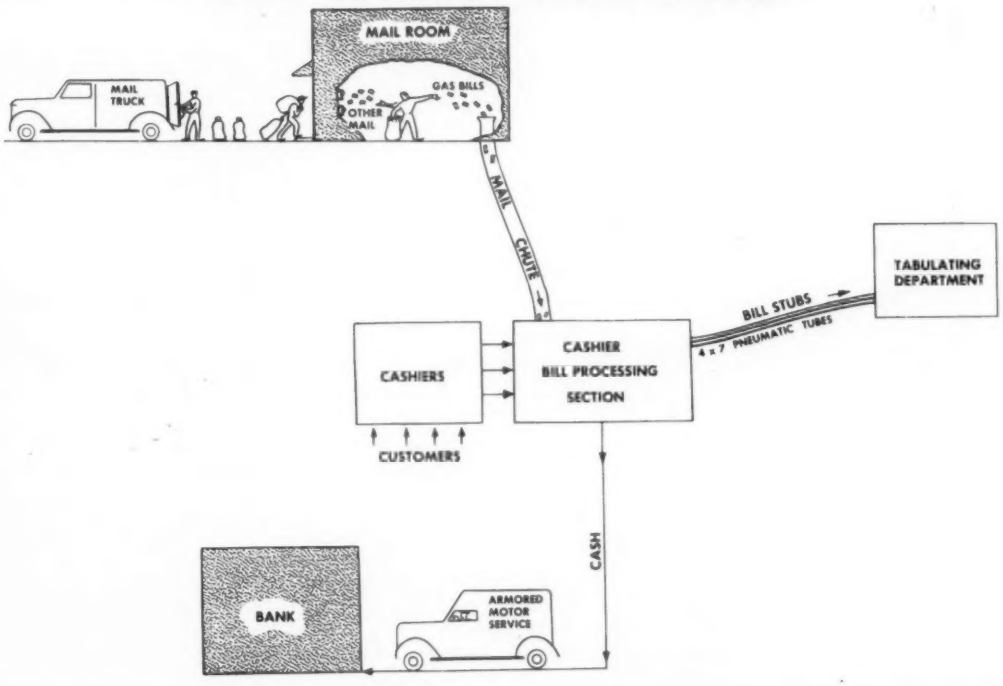
Four service salesmen's cars, operating out of street department headquarters, are also radio-equipped. Fast service is provided in expediting calls where new home construction or remodeling requires a change in gas service lines or meters.

Faster Mail Service

Establishment of the company's new Oak Cliff customer office with a drive-up payment window and designation of 40 neighborhood collection points in banks and supermarkets are other steps in the program.

Consolidation of mail handling for all Dallas offices of the company by establishing a single, central mail room in its Jackson Street building, is another step in the simplification and streamlining of customer operations. Mail tubes to the cashier department will allow handling of mailed bill payments

BILL PAYMENT FLOW CHART



in one-third of the time formerly required.

This is an important step in keeping accounts current and eliminating duplication of effort or customer inconvenience.

As mail is opened each morning, bill payments are tubed to the cashier section mail clerks from where they are processed and tubed to IBM customer accounting in a continuous daily flow.

An estimated 65 per cent of all bill payments are received by mail. During the month of August, for example, 130,000 of an approximately 197,000 bill payments were made in this manner.

Redesigning and modernizing of Sales, Home Economics, and Commercial offices in Dallas division are a major part of the program of public service improvement to meet present and future requirements.

"Customer service is our No. 1 concern," said a Dallas division spokesman. "Although the refurbished and modernized customer area is much more pleasing to the eye, it also has a definite part in the basic function of rendering better service with improved arrangement."

Public Contacts Aided

The public contact area of the first floor commercial section includes elimination of departmental functions such as applications, duplicate bills, deposit refunds, etc. Instead, these operations will be handled at any of 23 new customer contact "stations." With a continuing training program for personnel staffing this area, a full complement of 23 clerks can be assigned to the area during rush periods or can be reduced at other times, by reassigning the remainder of the staff to other duties.

The flexible plan will help to eliminate waiting periods for customers during rush periods. Each desk in this area has a direct telephone line to the second floor section, where individual customer records are handled, so that information may be obtained quickly and the time required for each customer contact held to a minimum.

With simplification of basic information requirements from new customers, the new procedures will also encourage increased telephone and mail handling of all types of customer service, including new applications.

Phone Service Enlarged

Considered the "nerve center" of customer service, the telephone service section on the second floor has been redesigned to meet this growing trend, and will play an increasingly important part in the automated system of the future.

The unitized telephone service, established five years ago, divided customer accounts into alphabetical and numerical groups. With 13 operators receiving customer calls from the main switchboard according to address, the time element per call has been reduced approximately 50 per cent.

Each operator has access to 25,000 current account records without leaving her desk. Formerly, they were required to leave their desks to look up records with which to complete the service calls.

A peak day often records about 2000 completed calls through this department, with "holding" time on all calls virtually eliminated.

To expedite record searching by this section, the specially designed telephone service desks have been grouped in a horseshoe arrangement around account record files. A total of over 1,500,000 records are housed in this area. A staff of 43 employees is required in the overall operation of this section.

New procedure has resulted in a minimum of time and effort required to obtain related information on all customer accounts.

It is anticipated that the future of this "nerve center" will require further expansion as growth of the city continues and customers become aware of the fact that Lone Star service is convenient service, most of which can be handled by telephone. ★ ★ ★

Planning for Emergency Operation Of a Gas Utility

Gilbert J. Williams,
Executive Vice President
The Connecticut Light and Power Company,
Hartford, Connecticut

A succession of serious afflictions by the weather — including three hurricanes in 1954 and three more in 1955 — has forcibly impressed The Connecticut Light and Power Company with the need for adequate preparation for meeting demands imposed by such disasters to restore service. This has certainly been pointed out in the graphic reports of the floods that struck Connecticut in 1955.

No longer is gas service of minor importance to our everyday living. These storms have proved that the services sold by utilities are the mainspring of the modern world. Yet never in advance do we seem to adequately visualize where and how badly we will be hit by an approaching disaster.

The lessons learned during previous emergencies help to prove invaluable in the handling of current ones, but circumstances are always different. Evolved from all these storm experiences, and compelled to face the fact that more disasters are inevitable, our company has formalized emergency proceedings in an **Emergency and Disaster Plan.**

This Plan was first conceived to meet the repeated threats of severe damage to our electric system. Major damage and restoration of the gas system, although an almost unknown experience prior to August, 1955, has been made a component part of the Plan. Backed by experiences with the 1936 and 1938 floods, with natural gas conversion, and the floods of August and October, 1955, the Emergency and Disaster Plan has been further enlarged to cover the specific problems of a gas system disaster — problems that are unique to the gas business.

Organizational Requirements

The Plan provides for setting up, at our company general office in Berlin, a company disaster operations headquarters, staffed by the various sections under a system director for overall supervision and assistance. These sections include accounting, construction, dispatching, employee relations, public relations, purchasing, etc.

It is the responsibility of the system director and the director of gas opera-

August 1955 flood caused fantastic damage in Waterbury at the Bank Street bridge. Gas mains across the bridge were ripped and broken as flood waters destroyed houses, ripped out railway tracks and carried debris from upriver to lodge against the battered bridge. Lessons learned here are being carried out in Connecticut Light and Power Company's Emergency and Disaster Plan.

Here's what Connecticut Light and Power Company has learned from previous disasters, what it is doing to prepare for future occurrences, and how to "be ready" when major interruptions occur in its gas system

Neat, well-kept office in Waterbury was reduced to near ruin. Valuable records and papers were destroyed or carried away. Planning must take into account such possibilities.

tions to arrange deployment of personnel to the stricken area from other districts of the company and from other gas companies.

A "disaster" should be declared when it appears the local organization cannot restore service in *one* day — and even in such cases it is often wise to call on neighboring areas for assistance. Reluctance to call on others for help delays restoration, and pride in the ability of local organizations to handle its own affairs should be discouraged if the result is extended service interruption.

Such cooperative effort by the various neighboring utilities is possible only by a continuing understanding of mutual problems. At no time, when we have been in serious difficulty, has one of our neighbors turned down our call for help, nor would we withhold assistance when called upon. Yet much of the invaluable assistance received from other companies in time of need would prove ineffective if we did not lay adquate plans for handling the men, caring for their comforts, and directing their efforts. We must be effective "good neighbors."

The general staff is organized for direction of the emergency forces and is also prepared to send in trained staff personnel, men, materials, and equipment to augment the local organization as required.

Each gas division and district is organized under the division or district gas engineer, with each employee assigned to and previously trained in emergency duties. The gas shutoff operation can be consummated with more inexperienced men than the turn-on, as you will understand. Salesmen, meter readers, and others, lacking in gas servicemen qualifications but trained for the emergency, when occasion demands will rise to unexpected heights of endeavor even under extraordinary circumstances.

The various supervisors are provided with company telephone directories for their homes so that they can call in their own sections at home without tying up the company telephone board.

"Be Prepared"

Made ready in advance are packages containing, among other items, sufficient copies of distribution maps by streets showing location of mains, regulator stations, etc., which will be ready for the turn-off and turn-on crews, with blown-up copies for the engineer and service supervisor or coordinator — ready for use at permanent or temporary headquarters. Maps, as well as the overall Plan, are brought up to date each year. Forms included in the package, and not dipped into for any but disaster use, are:

Daily Time Reports
Lodging and Restaurant Assignment
Foreign Crew Record
CGI Tags
Application Shutoff Tags
Pay Station Locations Directory
Company Telephone Directory

Also prepared in advance are lists of contractors, and equipment, who may be called on for help — excavating and grading, plumbing and heating, general construction, electrical, etc.—together with lists showing restaurants, caterers, hotels, motels, and rooming houses; other lists include town officials, Civilian Defense, and social service agencies.

In this connection, experience has taught us that, in a disaster like the 1955 floods in Waterbury and the Naugatuck Valley, where all sorts of services including water are affected, it is much better for those crews, imported from outside districts or companies, to be housed out of the stricken area and be transported each day by bus to the job.

This arrangement makes possible better opportunities for the men to keep clean, have two good meals a day — with a hot lunch provided, if possible — and get adequate sleep. Setting up cots and feeding the great numbers of men in the disaster area has proved false economy. Working the men into the night or too many hours, other than where the interruption is for a short period, will result in extraordinary fatigue with its accompanying loss of efficiency and safety.

Utilizing "Outside" Crews

The possibilities for colossal confusion and waste motion cannot be glossed over in an emergency operation of the type described. The fact that we were able in the August, 1955, flood to coordinate the efforts of hundreds of men, including over 400 servicemen from Consolidated Edison alone, is some indication of the success of effective preparation for what, to us, was a stupendous operation; in Waterbury alone we utilized the services of some 2000 men and women.

Our Emergency and Disaster Plan provides for receiving these men brought in from outside the local area, housing them, and distributing them by areas and teams, under their own supervisors but aided by our own field supervisors who are familiar with the locality. The efficiency of working these outside crews under their own supervisors was beautifully demonstrated by the

Huge circus tent was erected at Waterbury to serve as a temporary storeroom during emergency service restoration. Such measures should be planned if at all possible.

Consolidated Edison men brought in last year. Not only did they have a crew chief for each 20-man crew, but they had a general foreman, and a union representative whose cooperation was outstanding.

It must be recognized that it is possible to have groups involving several different unions with different contractual working conditions and therefore, keeping the groups in separate working units has many advantages. We call these fellows "Foreign Crews," not in the sense that they are "foreigners" to be looked down on, but rather to differentiate them and provide for them, as *all* very welcome friends and rescuers should be treated.

It must be noted that just having many men would not necessarily expedite restoration, especially if they are inadequately organized. Rather, it causes confusion, together with loss of morale and a slackening off of the effort.

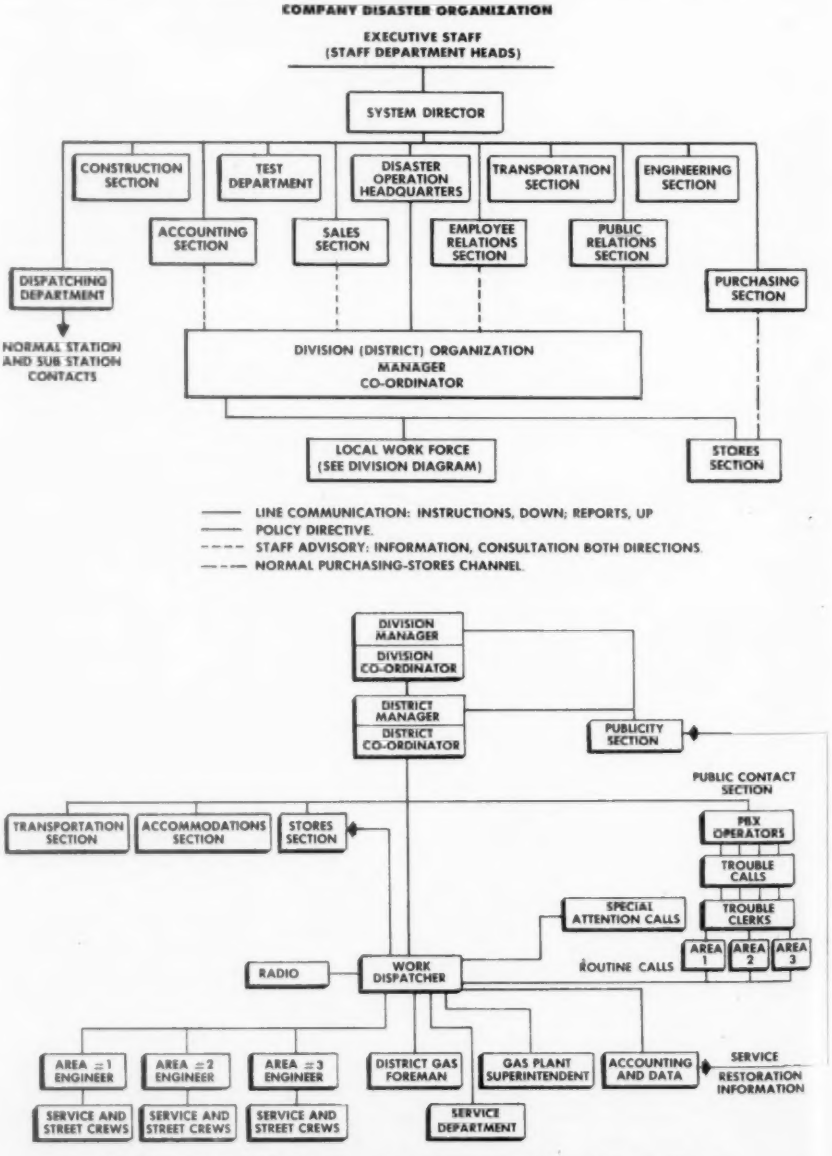
Keeping the Public Informed

Emergency and Disaster Plan, therefore, provides for a realistic approach to each disaster, a rapid and considered appraisal of the damage, and a coordinated restoration effort. Included in this last is a related and sometimes considered subsidiary activity, yet a very important company responsibility — that of public and employee relations, keeping our customers and employees informed of the degree of disaster, the awareness of our problems, and keeping safety ever uppermost in everyone's mind. All of us have a tendency to be optimistic about the duration of an outage, but here certainly is one time that the customer deserves an answer as down-to-earth as our contact people can convey.

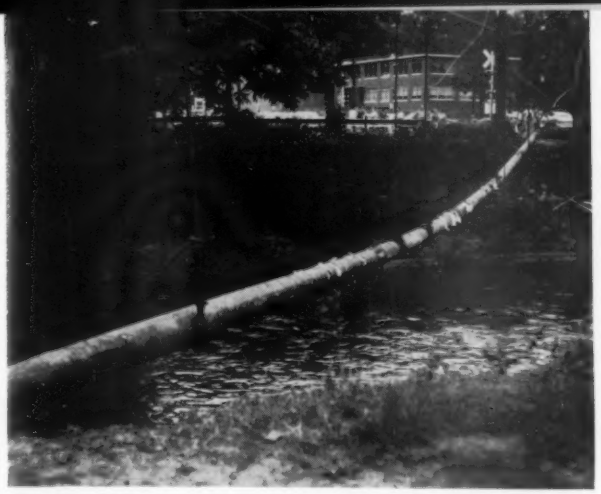
Full use of available radio, TV, and newspaper facilities should not be spared to keep the public informed of progress and ready for the turn-on operation. The fact that we received no word of criticism in the flood of last year is a tribute to the understanding of the public and our adequate information service — and this, mind you, despite a two-weeks' interruption in gas service to some 35,000 customers. It is, therefore, of inestimable value for the coordinator of the restoration job to work closely with the publicity section and the Plan so provides.

One side line to this question of publicity is pictures. Confucius said appropriately, "One picture worth 10,000 words." Unless photographers are assigned in advance, made a part of the Emergency Plan, there will be no continuous and complete pictorial story of the disaster.

You will undoubtedly realize that photography in a gas disaster has certain limitations. The photographer cannot be everywhere at once — on the spot when something happens. Then, too, gas main failures underground do not often lend themselves to exciting, eye-catching pictures. However, primed by training in advance for the kinds of human interest stories that a gas interruption engenders, and inspired by the restoration job being done, a photographer can help tremendously to get



Division and District Emergency Organization and Flow Chart



Where bridges are washed out over small streams, pulleys and hoists can be used to carry temporary gas mains to hasten service restoration.

Borrowed Army helicopter was used to carry crews to otherwise inaccessible area.

the company story across to the public. Pictures prove particularly helpful when coordinated with good news releases.

Handling Communications

Another phase of operations of the public relations and publicity sections is telephone communications. In our larger gas districts it has been possible to list our company *emergency telephone number* separately in the telephone book.

One listing covers all service, meter and trouble calls, the second, other business calls. With such an arrangement, the normal service and trouble calls by-pass the PBX operator and go directly to a service center where the customer location file is kept. Calls at this location are handled in rotation by a group of trouble clerks. Additional positions are provided so that in case of emergency, the number of trouble clerks can be easily expanded to accommodate the abnormal number of calls received. Such service centers have been located so that they are adjacent to the operating personnel, which greatly facilitates the dispatching of trouble calls during times of stress.

Dispatching early in a disaster can present some serious problems, particularly when all telephone communication is suddenly cut off and the dispatcher finds himself marooned. Such was one experience in the August, 1955, flood. Arrangements for emergency telephone connections were soon under way, but in the meanwhile our short-wave radio breached the gap.

Radio came to our rescue in the early stages too when one of our worst problems — traffic congestion — was at its worst. With bridges out, the city and valley cut in two, with sightseers and workers from closed factories piling into the disaster area, even the local police working night and day proved hopelessly inadequate to meet such disruption. Not until appeals to the state officials resulted in martial law and the arrival of the National Guard, was order brought out of this chaotic traffic condition in Waterbury, and our restoration activities expedited. Our relations with city and state officials, encouraged through our Emergency and Disaster Plan, stood us in good stead.

Again, when coordination of field forces for the turn-on operation was in progress, dispatcher-to-truck and truck-to-truck radio transmission afforded instant and on-the-spot control, saving untold hours — under such circumstances, the radio was silenced in adjacent districts to avoid all possible interference.

Gas Supply Interconnections

In our gas system planning, in order not to have all our eggs in one basket, we have given great thought to interconnection of pipeline supply and alternate use of various combinations of mixed gases to provide for different emergency situations. We are not on straight natural gas throughout our territory, and therefore some of our possibilities along these lines may be of interest.

In Waterbury, for instance, where we have a modern gas plant, natural gas is reformed to 420 Btu gas in the gas-making machines and enriched with straight natural gas to yield 565 Btu gas for distribution. This plant also produces carbureted water gas for peak shaving at certain times. In some of our natural gas locations, propane-air reserves are ready for use. Four standby propane plants are installed and another under construction. These plants are always ready for operation by trained men. Nor should I neglect to mention the interconnection point near the center of the state, where the two natural gas transmission pipelines can be quickly tied together.

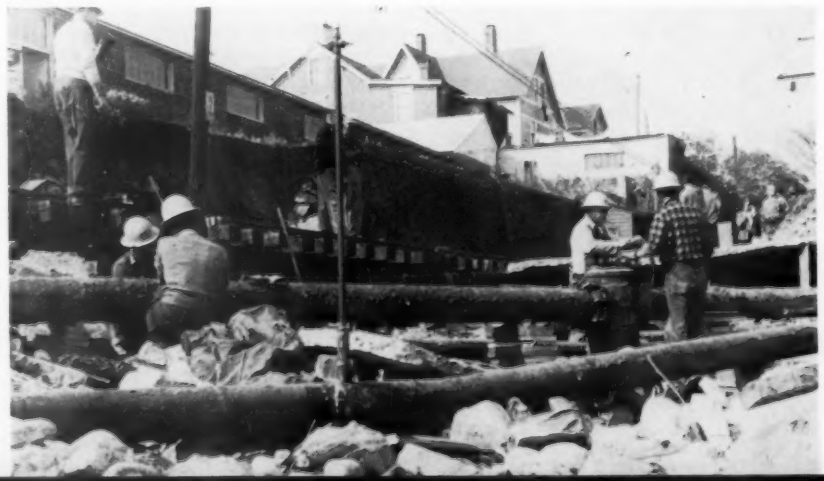
River and Creek Crossings

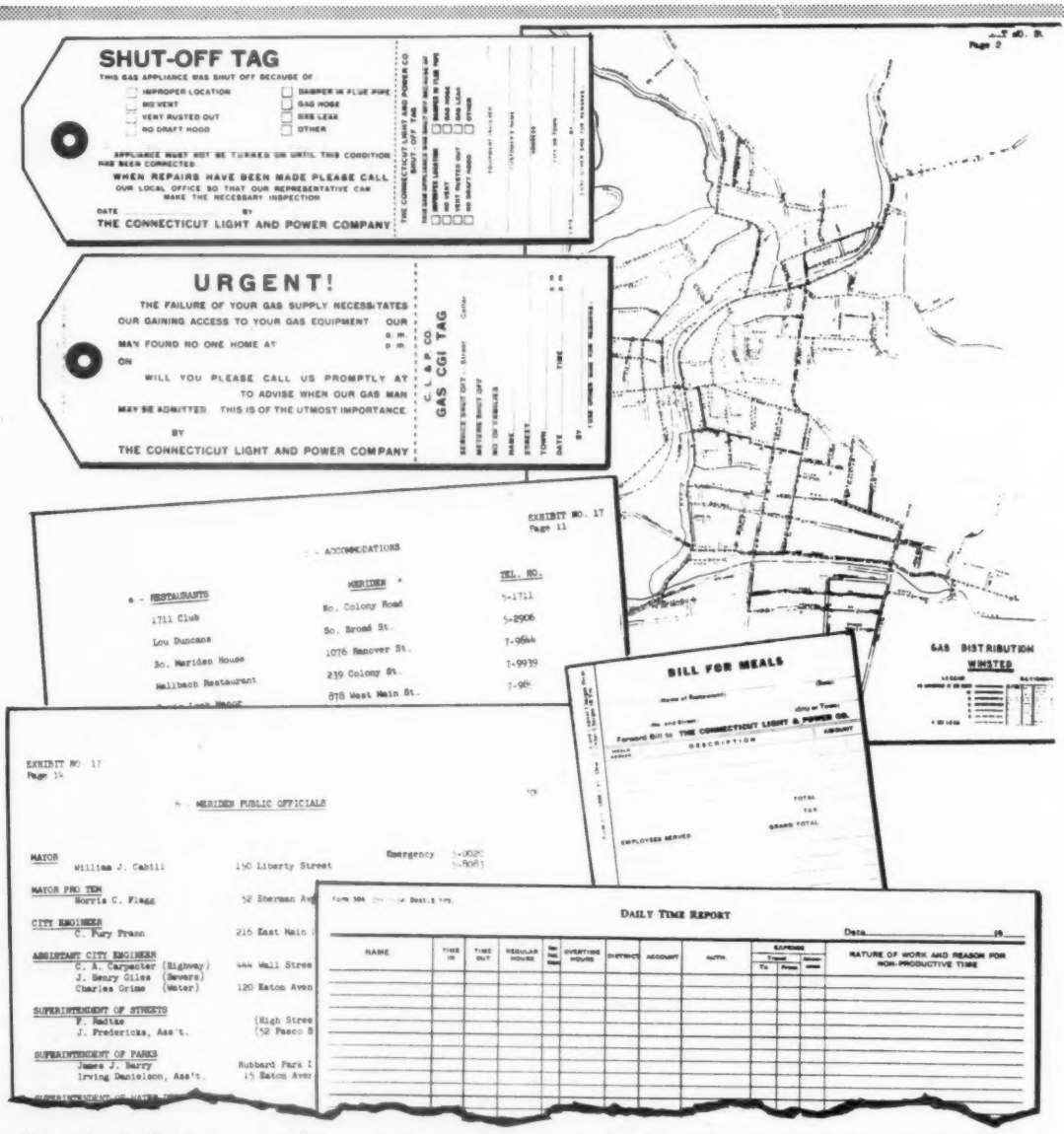
One important aspect of the lessons we learned from the floods, floods which in some cases were five times any maximum highs *ever* recorded, and floods that destroyed a dozen bridges and our mains with them, is that river and even small brook crossings now appeared in a new light.

Wherever possible, where by proximity to stream flow bridge spans offer a vulnerable weakness to the gas system, we are taking steps to bury the gas main in the river bed, to run parallel lines with valved off headers, or reroute the mains to a safer location.

We are looking at all our important stream crossings with a critical eye, for it could happen again, such rain as we had never before seen — 15 to 20 in.

Serious washout in Norwalk caused breaks in gas mains. Maintenance crews repair mains exposed by the washout.





Supervisor's Packages, containing such items as time reports, lodging and restaurant assignments, foreign crew records, CGI tags, shutoff tags, telephone directories, area distribution system maps, and lists of public officials in the area, are made up in advance. Sample sheets in a typical package are shown above.

in 24 hours where 45 in. is normal for a whole year! Is it any wonder our Waterbury gas plant was under 12 ft of water!

Vehicles

The loss of cars and trucks in the August, 1955, flood has also given us food for thought—a $250,000 loss was encountered in Waterbury alone. Although all sorts of passenger cars and delivery trucks are available for rental at a moment's notice, we have thought it prudent to delay the turn-in of some of our special-body trucks when replacement time comes along. A small fleet of these "old shoes" is therefore being held in reserve for use temporarily by gangs that may have to be flown into the state during the early days of a disaster. Actually, of course, upkeep is kept at a minimum and turn-in value is so low that such a course of action is permissible. The Connecticut Light and Power Company and the United States Government each has its moth-ball fleet!

Summary

This report has attempted to give you the benefit of our experiences, the strengths and weakness of our Emergency and Disaster Plan and to point out some of those areas which, it seems to us, are worthy of special attention. You have all probably gone through gas interruptions of varying severity, but I cannot emphasize too strongly the importance of having a Plan ready for any eventuality.

It might be asked, "If these major disasters to a gas system occur only once in every 10 or 15 years, how can we hope to keep interest alive in our organization?"

To answer this question, in The Connecticut Light and Power Company, we have set up in the Emergency and Disaster Plan a schedule of annual revision and re-examination of our problems and assignment of duties, and provide for training of both old and new people. In addition, a questionnaire is sent out to the districts at the same time, which in the years to come will include items requiring some local soul-searching — some local reappraisal — in regard to readiness to handle gas system disasters. None of us wants to get caught off base.

Acknowledgment

This article was developed from a presentation made at the New England Gas Association's Gas Utility Managers Conference, Boston, November 1956.

★ ★ ★

Work Authorizations:

How to keep track of them for Plant Accounting Records

William J. St. John
Plant Accounting Supervisor
Southern Union Gas Company
Dallas, Texas

WORK authorization procedures are the most important single procedure in accounting for gas plant. Without good procedures and control of appropriations, the firm foundation for plant accounting is lost. These procedures are the beginning — the start toward capitalization of funds expended for plant property. They are the guide used for processing "through work" that is underway and finally getting it into the property records.

Work authorization procedures are called many things in various companies. In Southern Union Gas Company, it is called the Authority For Appropriation procedure, or AFA procedure. Whatever its name, it is the procedure used to obtain authority or approval to do work.

Southern Union's procedure is dual purpose. It is the *Authority For Appropriation* until such time as proper approvals have been obtained and plant accounting has assigned it a number. It then becomes a *work order*, and as such has its own work order procedure.

The work authorization procedure provides a method for accounting for all proposed construction and retirement, including maintenance, shop work such as pipe wrapping, joint interest well drilling, surveys and studies, and other work. The procedure sets up the basis for entries to the continuing property records. The basic concept of the system is that all documents needed for approval of the project can be prepared at one writing.

Southern Union operates in Texas, New Mexico, Arizona, and Colorado — and with the home office located in Dallas, at which point it does not have operations, it is important that all work authorization be as simple as possible. Therefore, the procedure requires a maximum of four forms from beginning to completion.

These forms are, in the order of their preparation:

A form used for sketching the work to be done. This sketch is usually a simple penciled sketch. However, it can be a detailed plan for a larger project. It is understood, of course, that not all work authorizations require a drawing (the purchase of transporation equipment, for instance).

Second form is the original draft of the work authorization and includes an itemization of estimated material and installation costs. The person preparing the form must break down his material into retirement units. This form remains in the field office and is their proposed job memo until such time as the approved work authorization or work order is returned from the home office.

Each proposed project for which a work authorization form is required must be approved by the home office before work can be started. Naturally, there is an emergency procedure, in which case approval for construction can be obtained by phoning or telegraphing the home office.

After the first two forms mentioned have been prepared, they are attached together and passed to the construction clerk, who prepares the actual work authorization form.

The work authorization form or AFA form contains a large amount of information, most important of which is the description, purpose and necessity, property section number, primary account number, retirement unit number, material estimate as set apart from summary of estimate, which is also included, and the AFA number. Each AFA submitted to the home office must be assigned an AFA number by the issuing office, and no two AFA's can carry the same number.

The AFA form is a multi-purpose snap-a-part form and is prepared in original and six copies. After proper approvals, the original remains in the plant accounting files at the home office. The first copy is for home office engineering files. The second copy is forwarded to the district office. The third, fourth, fifth, and sixth copies are returned to the originating office, two of which are returned to the home office when work has been completed and are known as completion reports.

The fourth form is the purchase requisition, which is prepared when material or labor cannot be furnished by the company.

When the AFA form has been prepared in the originating office, the drawing or sketch and the purchase requisition are attached and forwarded to the district manager for approval; then to the area vice president's office. From the area vice president, the form is mailed to the home office engineering department. All of these mentioned approvals must be obtained before the AFA is forwarded to the plant accounting department.

The plant accounting department registers the AFA, checks the accounting distribution, retirement units, and for conformance to our work authorization procedure. A work order number is assigned then, the form is snapped apart and copies previously mentioned are returned to the offices concerned.

The procedure, perhaps, appears to be time consuming. Actually, periodic checks indicate it takes only 6 to 10 days to process a work order from origination to beginning of work in the field location.

This, briefly, is Southern Union Gas Company's work authorization procedure. As for work authorization controls, they are many and varied. Some of the important ones are:

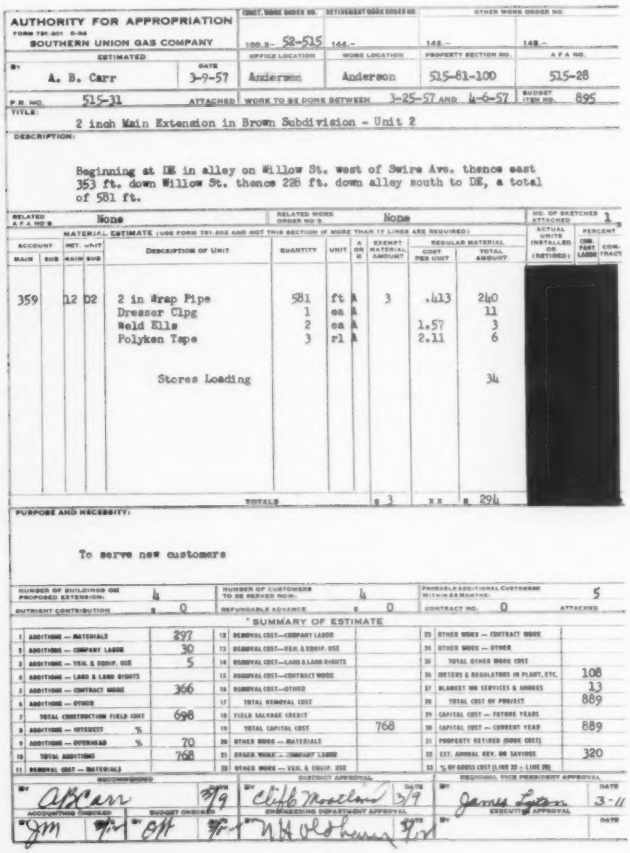
For each work order number assigned to a work authorization, a card is prepared in the machine accounting section. This card contains the work order number, the budget item number, and the estimated cost. From these cards, and cards made from actual transactions, monthly comparisons are furnished to management as to amount estimated, amount expended, and amount closed to plant.

Limitations are established for variance from estimated amount or type of material used. These limitations are:

1. If, before construction is begun, it is known that the equipment as originally proposed for installation is to be changed, a revised work authorization must be submitted through the same channels as previously mentioned for approvals. The work order number, however, usually is not changed.
2. If, while construction is in progress, it becomes evident that the actual cost will vary from the estimated by 25 percent or more, a revision is again necessary and approvals must be obtained.

Authority for Appropriation form is shown at top. Original draft and the actual AFA are same — except first draft is single sheet and AFA form has original and six copies in a "snapout" business form.

Purchase Requisition, bottom, is used when outside services or material are required for projects.



AUTHORITY FOR APPROPRIATION
SOUTHERN UNION GAS COMPANY

ESTIMATED BY: A. B. Carr	DATE: 3-9-57	OFFICE LOCATION: Anderson	WORK LOCATION: Anderson	PROPERTY SECTION NO.: 515-81-100	A F A NO.: 515-28
P R NO.: 515-31	ATTACHED	WORK TO BE DONE BETWEEN: 3-25-57 AND 4-6-57		BUDGET ITEM NO.: 895	

TITLE: 2 inch Main Extension in Brown Subdivision - Unit 2

DESCRIPTION:

Beginning at DE in alley on Willow St. west of Swire Ave. thence east 353 ft. down Willow St. thence 228 ft. down alley south to DE, a total of 581 ft.

RELATED A F A NO.: None — RELATED WORK ORDER NO.: None — NO. OF SKETCHES ATTACHED: 1

MATERIAL ESTIMATE (USE FORM 701-502 AND NOT THIS SECTION IF MORE THAN 17 LINES ARE REQUIRED)

ACCOUNT MAIN	ACCOUNT SUB	NET. UNIT MAIN	NET. UNIT SUB	DESCRIPTION OF UNIT	QUANTITY	UNIT	A OR B	EXEMPT MATERIAL AMOUNT	REGULAR MATERIAL COST PER UNIT	REGULAR MATERIAL TOTAL AMOUNT	ACTUAL UNITS INSTALLED OR (RETIRED)	PERCENT COM. FOOT LABOR	PERCENT CON. TRACT
359		12	02	2 in Wrap Pipe	581	ft	A	3	.413	240			
				Dresser Clpg	1	ea	A			11			
				Weld Ells	2	ea	A		1.57	3			
				Polyken Tape	3	rl	A		2.11	6			
				Stores Loading						34			
				TOTALS				$ 3	XX	$ 294			

PURPOSE AND NECESSITY:

To serve new customers

NUMBER OF BUILDINGS ON PROPOSED EXTENSION: 4 — NUMBER OF CUSTOMERS TO BE SERVED NOW: 4 — PROBABLE ADDITIONAL CUSTOMERS WITHIN 24 MONTHS: 5

OUTRIGHT CONTRIBUTION: $ 0 — REFUNDABLE ADVANCE: $ 0 — CONTRACT NO.: 0 — ATTACHED

SUMMARY OF ESTIMATE

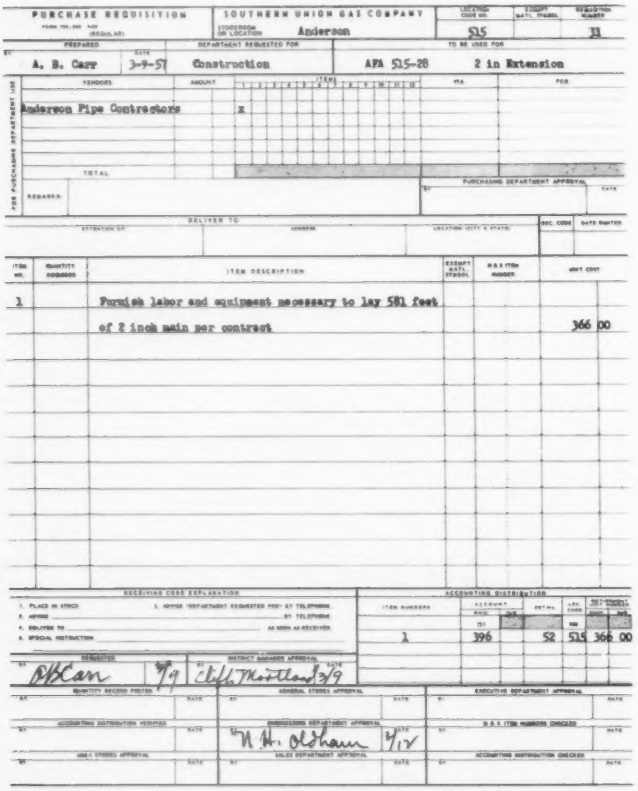
1	ADDITIONS — MATERIALS	297	12	REMOVAL COST—COMPANY LABOR		23	OTHER WORK — CONTRACT WORK	
2	ADDITIONS — COMPANY LABOR	30	13	REMOVAL COST—VEH. & EQUIP. USE		24	OTHER WORK — OTHER	
3	ADDITIONS — VEH. & EQUIP. USE	5	14	REMOVAL COST—LAND & LAND RIGHTS		25	TOTAL OTHER WORK COST	
4	ADDITIONS — LAND & LAND RIGHTS		15	REMOVAL COST—CONTRACT WORK		26	METERS & REGULATORS IN PLANT, ETC.	108
5	ADDITIONS — CONTRACT WORK	366	16	REMOVAL COST—OTHER		27	BLANKET MO SERVICES & ANODES	13
6	ADDITIONS — OTHER		17	TOTAL REMOVAL COST		28	TOTAL COST OF PROJECT	889
7	TOTAL CONSTRUCTION FIELD COST	698	18	FIELD SALVAGE CREDIT		29	CAPITAL COST — FUTURE YEARS	
8	ADDITIONS — INTEREST %		19	TOTAL CAPITAL COST	768	30	CAPITAL COST — CURRENT YEAR	889
9	ADDITIONS — OVERHEAD %	70	20	OTHER WORK — MATERIALS		31	PROPERTY RETIRED (BOOK COST)	
10	TOTAL ADDITIONS	768	21	CRAIN WORK — COMPANY LABOR		32	EST. ANNUAL REV. OR SAVINGS	320
11	REMOVAL COST — MATERIALS		22	OTHER WORK — VEH. & EQUIP. USE		33	% OF GROSS COST (LINE 32 ÷ LINE 28)	

RECOMMENDED — DISTRICT APPROVAL — REGIONAL VICE PRESIDENT APPROVAL

BY: ABCarr 3/9 — BY: Cliff Moellers 3/9 — BY: James Lyon 3-11

ACCOUNTING CHECKED — BUDGET CHECKED — ENGINEERING DEPARTMENT APPROVAL — EXECUTIVE APPROVAL

"JM 3/9 "Off 3/9 "M H Oldham 3/9 — DATE



PURCHASE REQUISITION (REGULAR) — SOUTHERN UNION GAS COMPANY — LOCATION CODE NO.: 515 — REQUISITION NUMBER: 33

STOREROOM OR LOCATION: Anderson

PREPARED BY: A. B. Carr — DATE: 3-9-57 — DEPARTMENT REQUESTED FOR: Construction — TO BE USED FOR: AFA 515-28 2 in Extension

VENDORS	AMOUNT	ITEMS	YTA	FOR
Anderson Pipe Contractors		X		
TOTAL				

REMARKS — PURCHASING DEPARTMENT APPROVAL

DELIVER TO — DEC. CODE — DATE WANTED

ITEM NO.	QUANTITY REQUIRED	ITEM DESCRIPTION	EXEMPT MATL. STORES	G & S ITEM NUMBER	UNIT COST
1		Furnish labor and equipment necessary to lay 581 feet of 2 inch main per contract			366 00

RECEIVING CODE EXPLANATION — ACCOUNTING DISTRIBUTION

ITEM NUMBER	ACCOUNT MAIN	ACCOUNT SUB	DETAIL	LOC. CODE	NET UNITS MAIN	NET UNITS SUB
1	396		52	515	366	00

REQUESTED BY: ABCarr 3/9 — DISTRICT MANAGER APPROVAL: Cliff Moellers 3/9

QUANTITY RECORD POSTED — MATERIAL STORES APPROVAL — ENGINEERING DEPARTMENT APPROVAL: M H Oldham 3/10 — EXECUTIVE DEPARTMENT APPROVAL

ACCOUNTING DISTRIBUTION VERIFIED — G & S ITEM NUMBERS CHECKED

400 # STORES APPROVAL — SALES DEPARTMENT APPROVAL — ACCOUNTING DISTRIBUTION CHECKED

During the monthly closing of completed work orders, comparisons are made in plant accounting, again looking for variances of 25 percent or more and management is notified when this occurs.

Additional control is obtained by the use of budget comparison. Each AFA is assigned a budget item number. The amounts estimated are accumulated monthly against the amounts budgeted annually for each budget item. A report of the budget comparison is furnished monthly to management.

There are actually four procedures involved—the work authorization procedure, the control procedure, the work order procedure or procedure for work in progress, and the completion report procedure. Each, because of its importance to Southern Union plant accounting procedures, is a topic for discussion in itself.

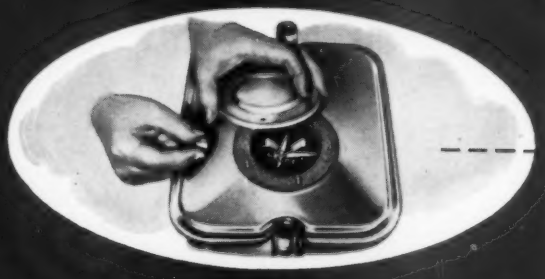
A point of interest is the method of classifying the work authorizations into the work order numbering system. All work authorizations are classified into three categories, whether they be construction, retirement, maintenance or other. The categories are:

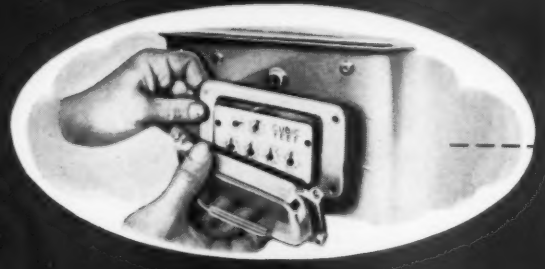
1. *Annual work authorization* — in other words, one work authorization per year for each location is required. These annual work authorizations cover such things as the installation of customer meters, house regulators, services, and distribution cathodic protection.
2. *Blanket work authorization.* This type of work authorization provides for grouping similar installations together in a common work order number. Each proposed project in this category requires the preparation of an individual work authorization. However, the same work order number will be assigned to each work authorization.
3. Third group is the *specific group* or the more complex group and each work authorization is assigned a specific work order number.

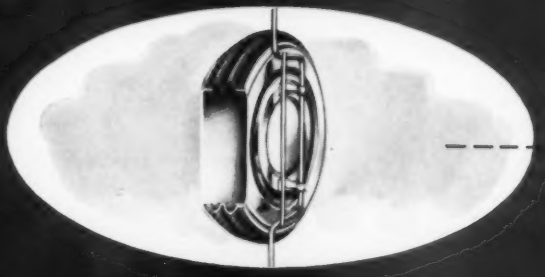
Acknowledgment

This article prepared from a presentation made at the Southern Gas Association annual convention, New Orleans, Louisiana, 1957.

New Advanced Design AMERICAN® "W" series Steelcase Meters







...dicase meter accessibility through ...ily opened handhole.

...nterchangeable Index — ...ternal and isolated ...om pressure with ...as-tight frictionless ...ubber grommet ...drive-shaft seal.

...Molded Duramic ...Diaphragms and ...Reinforced Flag Rods ...provide trouble-free ...accurate service for ...entire meter life.

- ★ **Light Weight, Welded Steelcase Construction**
- ★ **Proven Speed Ratio for "Sustained Accuracy"**
- ★ **Long Service Life at Lowest Maintenance Cost**
- ★ **New Lifetime Corrosion Protection Coatings**

And every American meter refinement developed in 120 years of meter engineering.

MODEL W-175

The unusual advantages of this new series by American open entirely new possibilities in meter maintenance and retirement.

W-75 Rated Capacity 75cfh FOB Philadelphia, W-45-LPG Rated Capacity 45*cfh FOB Philadelphia, W-175 Rated Capacity 175cfh FOB Fullerton Calif., W-210 Rated Capacity 210cfh FOB Philadelphia, W-250 Rated Capacity 250cfh FOB Philadelphia, W-300 Rated Capacity 300cfh FOB Philadelphia

*Propane.

Rated capacities based on 0.64 sp. gr. gas at ½-inch pressure drop—5 psi working pressure.

Consult your American Meter representative for full information.

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Houston Natural helps its dealers make money while building its load . . .

Gas Dryers?

Sell 'em by the Carload!

Kenneth C. Reed,
Regional Manager,
Sales Promotion,
Houston Natural Gas Corporation,
Houston, Texas

Walter Holland, center, owner of Automatic Service Company, Texas City, cracks his first carload of gas dryers, assisted by Ken Reed, left, Houston Natural Gas and S. R. Perkins, Hamilton distributor.

LIKE many other gas utilities over the nation, Houston Natural Gas Corporation has tried a number of various dryer promotions since the introduction of the gas dryer, with success ranging from fair to excellent.

All of the usual methods have been tried — spiffs, contests, prizes, cooperative advertising, special financing terms, etc. From experience gained in all these efforts, Houston Natural has evolved an entirely new type of dryer promotion that has proved more successful than any previous effort.

Proctor Thomas, Houston Natural's vice president, sales, calls this new promotion the **"Carload Dryer Sale."**

Since its development a year ago, four carloads of gas dryers have been sold in towns served by HNG by independent dealers, at an expense to the utility of $5 to $7.50 per unit.

How It Began

The idea began in the summer of 1956, at a time when dryer sales normally face their greatest slump. HNG was fortunate in having a dealer in Texas City, Texas, who was interested in selling a product with a profit in it — at a time when other dealers were selling window air conditioners virtually at cost.

In conversations with the dealer and the local Hamilton distributor, a Houston Natural sales representative conceived the idea that the dealer could, under proper circumstances, sell an entire carload of gas dryers.

Reluctant to think in terms of such a large promotion, because of the fact that the season was against him, the dealer conceded that he might be able to sell 30 to 35 units in June, by making a special offer to consumers in a heavy advertising campaign.

Several conversations along this line were held, until finally the dealer, the distributor, and the utility representative were able to reach an agreement whereby all three would participate in a plan to sell dryers.

The distributor made available a special price on top-of-the-line dryers, agreed to a special advertising allowance, provided premiums, and provided a vacuum cleaner to be used as a door prize during the first week of the campaign.

Ultimately, the dealer felt that he would prefer to have the special advertising allowance in the form of a discount on the price of the merchandise, and to stand all advertising costs by himself without distributor help. The distributor consented to this arrangement.

HNG Helped

Houston Natural agreed to do the following things:

1. Allow the dealer a 30-day free floor plan, at the end of which time a conventional floor plan with interest would be available (cost of free floor plan, $83).

2. Prepare, address, and pay postage for 10,000 postcards to be sent to every meterholder in Texas City (cost, $378).

3. Assist dealer in the usual ways, with store demonstrations, merchandise display at the utility office, etc.

(Part promotion costs were recovered from income on retail financing paper sent to Houston Natural by dealer. HNG finances dryers for $5 down and 40 months to pay balance.)

Through Houston Natural, the dealer purchased 66 Hamilton dryers (a short car — normally there are 88 units in a car) valued at just under $10,000. He undertook an extensive advertising campaign, utilizing newspaper and radio, with some television.

Telling his friends and prospective customers about his coming sale, the dealer received commitments from 20 people to buy dryers before the merchandise actually arrived.

In his advertising, the dealer offered the following:

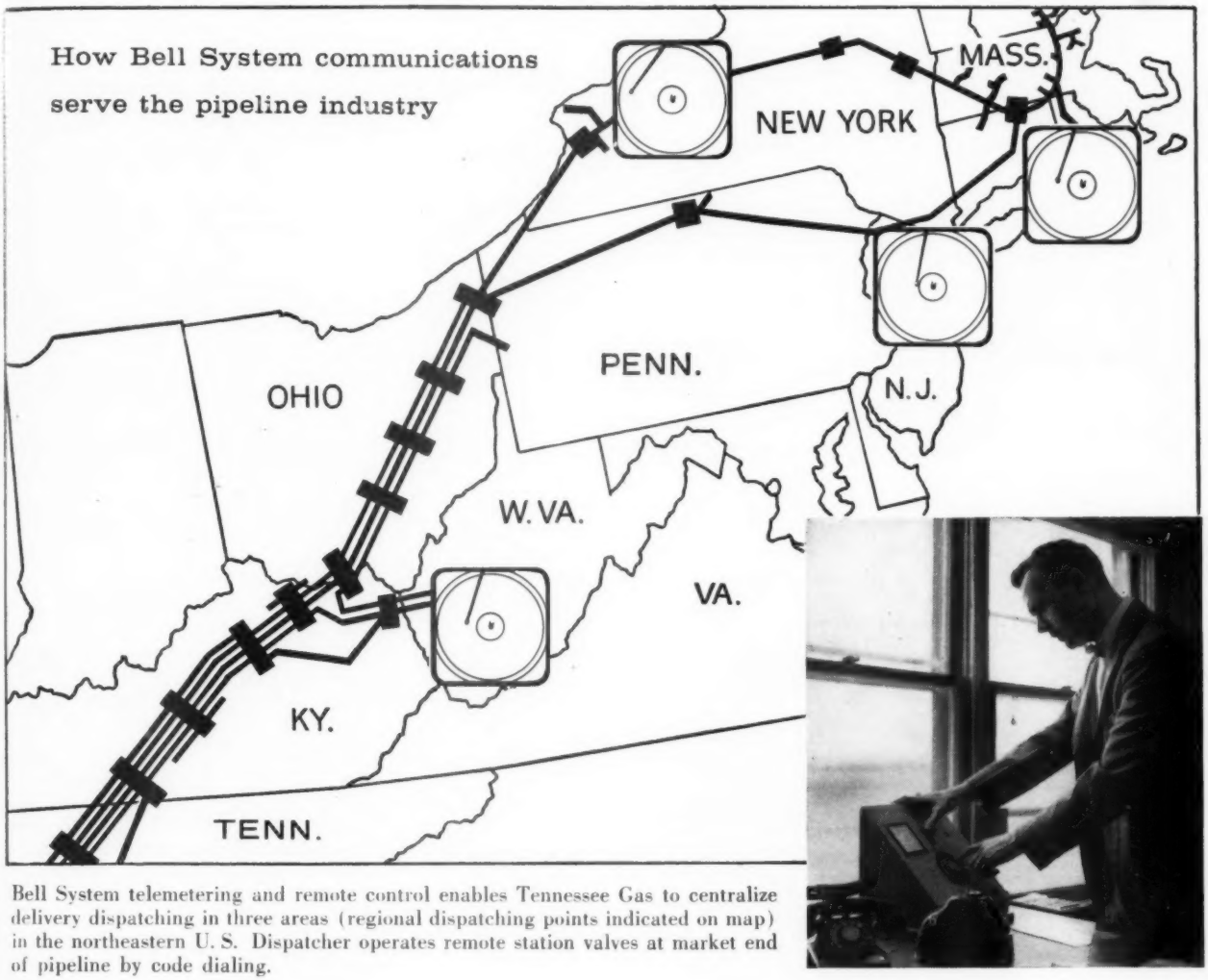
1. *Special price on the dryer itself.*
2. *Free installation.*
3. *$15 Cannon towel set as a premium.*
4. *Chance to register for door prize.*

Interest Grows

Keeping a close personal supervision

WHAT THE "CARLOAD DRYER SALE" DOES FOR THE DEALER

1. Permits him to buy merchandise at less cost than would otherwise be possible.
2. Gives him a promotion to stimulate his business — increases sales of other products as well as dryers.
3. Establishes him as a leader in the dryer field — dividends to be reaped for years to come.
4. Forces him to work — you can't go home early with a carload of dryers bulging out the sides of the warehouse.



Bell System telemetering and remote control enables Tennessee Gas to centralize delivery dispatching in three areas (regional dispatching points indicated on map) in the northeastern U. S. Dispatcher operates remote station valves at market end of pipeline by code dialing.

Tennessee Gas pumps to market with the aid of remote metering and control

Bell System channels for remote metering and control permit Tennessee Gas Transmission Company dispatchers to regulate delivery at 16 unattended measuring points in the northeast.

Almost half of TGT's 1.8 billion cubic foot daily load is metered to four regional dispatching offices near major market areas. Over-all dispatching of the pipeline system is co-ordinated by Bell System private line telephone from Houston, Texas, headquarters.

TGT regional dispatchers open or close valves at delivery points by code dialing. A safety feature in the system enables them to stop delivery in 30 seconds in the event of an emergency.

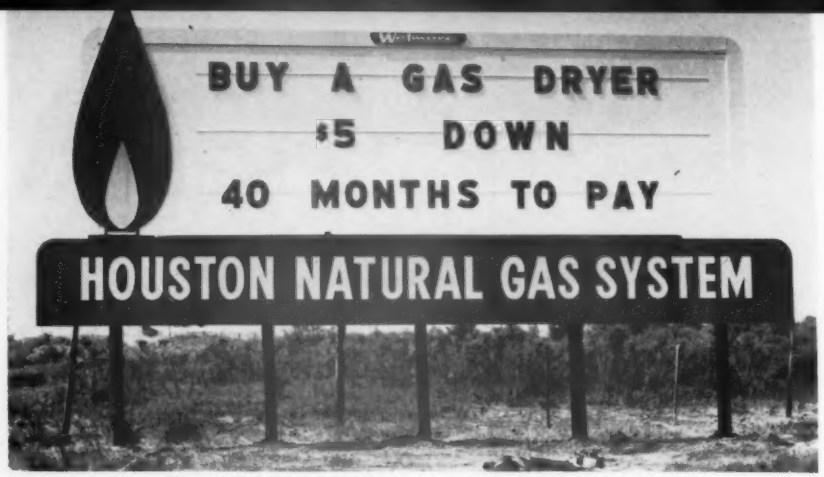
• • •

Efficient communications can save manpower, keep costs down for you, too. Just call your Bell Telephone Company business office. A representative will discuss your needs.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER • DATA TRANSMISSION SYSTEMS

CHANNELS FOR: REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV



Marquee-like poster in Texas City was devoted to dryers during the period of the carload dryer promotion by the dealer there. At other times, sign is used for promotion of civic events. Copy is changed weekly.

on this campaign, Thomas advised his sales representatives to discuss with selected dealers in other towns the possibility of their taking advantage of this program.

Subsequently, a dealer in Baytown and one in Houston agreed to participate in similar promotions in their areas.

In spite of weather hazards (there was no rain until late in November) all three dealers were pleased with the success of the promotion, and have made plans to repeat it. The Houston dealer, in fact, has already received his second carload.

Texas City's dealer sold enough dryers the first 30 days to pay off the floor plan in full. It took him seven months to dispose of the remainder, however, because he was not able to keep up a high volume of advertising. He reported, incidentally, that he had only two service calls, both minor, on the entire 66 units.

Baytown's dealer sold his carload in six months. He had to make only three service calls on the dryers.

Both dealers are negotiating for purchase of second carloads.

The Houston dealer completed selling his carload in five months, immediately re-ordered, and is now almost halfway through his second carload, with the weather in his favor.

Two other Houston dealers have since become involved in carload promotions.

Plan Has Pitfalls

From Houston Natural's experience with these carload promotions, Thomas points out that there are a number of pitfalls to be avoided:

1. Dealer must be financially sound.

2. He must WANT the deal, and not be pressured.

3. He must have demonstrated his loyalty to gas appliances, and his ability to sell gas dryers.

4. He must be made to understand that the dryers will not be sold overnight, and that his advertising must be supplemented by a great deal of hard selling.

Many Advantages, Too!

At the same time, Thomas points out, there are a number of important advantages to the program, if properly carried out:

1. A large number of dryers are moved in a sure-fire promotion at minimum cost, compared to overall dryer promotions, which often fail to move nearly so many units, and at a higher cost per unit.

2. Promotion creates a favorable effect on other dealers. In each town, the carload promotion generated gas dryer activity on the part of other dealers.

3. As word spreads of the success of the promotion, you have a strong lever to use with other dealers and distributors to insist that they promote gas appliances, before they can qualify for this promotion.

4. With the "carload idea" planted in the dealer's mind, you can approach him later with similar promotions on Servel, gas ranges, and other products.

Fit Plan to Dealer

Many variations are possible on this type of promotion, and the program must be fitted to the needs of the particular dealer.

For instance, the first three carload dealers were offered a 30-day free floor plan. Subsequently, 90-day and 150-day plans have been offered.

One of the first dealers did not feel that the direct mail was of much help, and in his second carload he was given a cooperative advertising allowance instead. This money was offered on a 50-50 basis.

One of the dealers did not have adequate warehousing space, and the local utility office was able to give him space in its warehouse.

Some dealers, who do not feel capable of handling a full carload of gas dryers, have asked for a similar promotion involving a mixed car of washers and dryers. One dealer is ordering a car consisting of 54 Bendix Duomatics and 6 dryers.

In cases where washers are involved, Houston Natural elected to offer less promotional money than on those in which only gas dryers were involved.

Conclusion

The "Carload Dryer Sale" can be an effective tool for non-merchandising utilities over the nation, and for those merchandising utilities which have an active dealer program.

Adequate safeguards will have to be provided, dealers must be selected carefully, and the program will, of course, have to be adapted to local conditions, but the idea is sound and has been proved in actual operation. It may well offer the gas industry an effective method for gaining the lead in dryer sales. ★ ★ ★

Unable to compete with large newspaper advertisers, Pittsburg Appliance Company of Houston had to seek novelty in an effort to call attention to its carload sales of gas dryers. This city bus cruises through a large part of downtown Houston.

Standardized..

Standardization of truck bodies and equipment is increasing in importance. Operating companies have found that standardized bodies improve efficiency. They enable crews to work from different vehicles with no difficulty in locating tools or supplies. They reduce operating costs by stepping up productive manhours. They provide fleet similarity...and are most economical from the standpoint of initial investment and maintenance costs.

In the Powers-American line you'll find standardized service, maintenance, and construction bodies...built to specifications that are based on known requirements. Modifications can be made, if necessary, to fit your needs. Production in quantity reduces cost and delivery delay. Why not investigate the merit of these bodies for your job?

STANDARD SERIES 850-C GAS AND WATER LINE CONSTRUCTION BODY, with built-in air compressor and air hose reels.

Custom-Made

The widely varied operations necessary in transmission of gas or water makes complete body standardization impractical. In supplying custom-made bodies and equipment to operating companies throughout the country, Powers-American engineers have developed production methods that greatly reduce costs. If your work requirements call for equipment that is tailor-made in every respect...or if you can use bodies which are modified from standard designs...Powers-American can supply the unit you need, at a cost that is reasonable. Should you require complete plans or assistance in the development of special equipment, Powers-American engineers are at your service.

CUSTOM-MADE LINE CONSTRUCTION BODY

POWERS American GAS & WATER BODIES

Want more information on Powers-American standardized bodies? Just drop us a line and tell us the type of body you need. For details on custom-made bodies, please send us a description of the equipment you require, plus sketches which may be helpful in supplying the data you desire.

CUSTOM-MADE SERVICE BODY

STANDARD SERIES 44 SERVICE BODY

McCABE-POWERS AUTO BODY CO.

5900 NORTH BROADWAY, ST. LOUIS 15, MO.

428 LATHAM SQ. BLDG., OAKLAND 12, CALIF.

"The Accepted Standard with Utilities Everywhere"

Here are Four 'Gimmicks' You Can Use to Improve Safety in Operations

Imagineering, applied in either small or liberal quantities, can go a long way in improving the safety of utility operations. At a recent safety conference of the New England Gas Association operating division, the four "safety gimmicks" illustrated in this article were presented. They are tools, devices, or adaptations that substantially improve the safety of work methods in the gas utility industry.

First device shown is a "Saf-Tee-Vee" meter handling grip, presented by Harris Anstey, safety director, New Haven Gas Company. The grips, which come in pairs, consist of pieces of heavy gage brass wire formed to lock over the inlet or outlet fitting of a tin meter to improve the ease and safety of handling these cumbersome devices. Meter damage due to dropping is reduced by the use of these grips.

Second device was a special stopper developed by W. L. Cobb, assistant superintendent, North Shore Gas Company. This stopper can be inserted into a service from the cellar of a house to stop the flow of gas in the service in a typical situation where the service might be leaking at the foundation wall. The stopper can be equipped with extension rods of varying lengths to increase its adaptability.

Third device, used in conjunction with compressed air drills in street operations, was developed by Arthur Clough, superintendent of distribution, Mystic Valley Gas Company. This device consists of a coupling to which ears of 2-in. by ¼-in. metal are welded. In use, the compressed air drill operator places the device on the pavement, stands on the ears to steady the device, and inserts the drill in the coupling to improve the safety of starting to drill in hard pavement. Using the coupling as a guide prevents the drill from bouncing around on the pavement at the start of a hole with possible resultant injury to the drill operator.

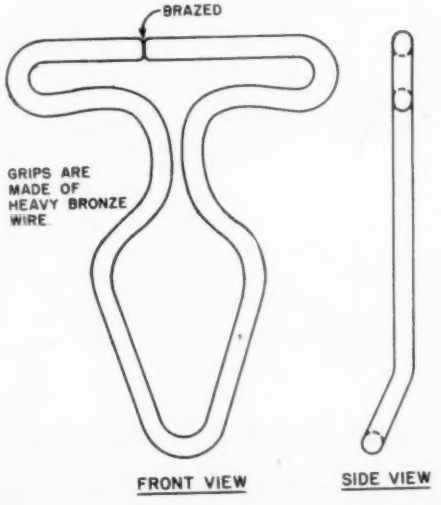
Fourth device is a safeguard for striking tools, such as wedges, star drills, bull points. This was developed by Richard Dowley, New England Power Service Company. It consists of a section of rubber hose, placed on the striking end of the tool. When the tool has been used for some time, the burrs on the head of the tool become imbedded in the rubber hose instead of flying into space. Various diameters are used, depending upon the size of the tool.

Details on each of the devices follow

METER HANDLING GRIPS

Idea presented by | Harris Anstey
Safety Director
New Haven Gas Company

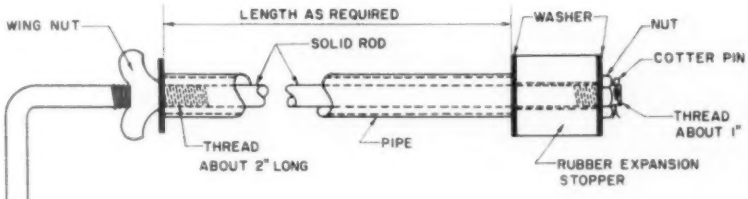
These meter grips, used in pairs, are formed of heavy brass wire to lock over the inlet or outlet fittings of tin meters. They improve the ease of handling these cumbersome devices and prevent damage due to dropping.



SERVICE STOPPER

Idea developed by | W. L. Cobb
Assistant Superintendent
North Shore Gas Company

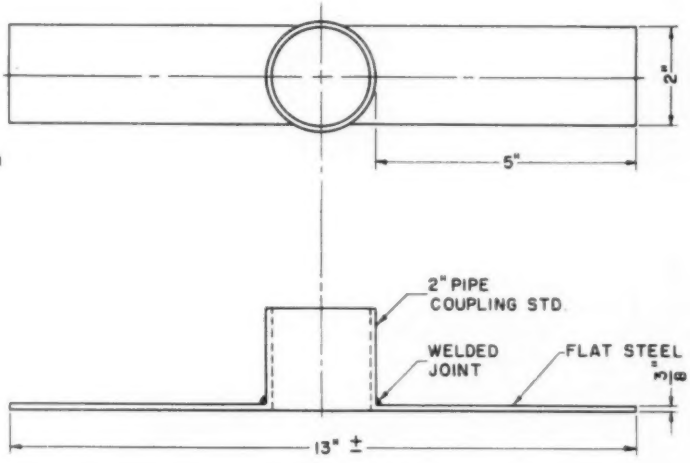
This device is inserted through service tee to seal a leak temporarily within or outside of cellar wall. Stopper is inserted full length and effectively seals leak until service can be dug. Varying lengths of extension rods can be used to increase the device's adaptability.



AIR DRILL SAFETY GUIDE

Idea developed by | A. W. Clough
Superintendent of Distribution
Mystic Valley Gas Company

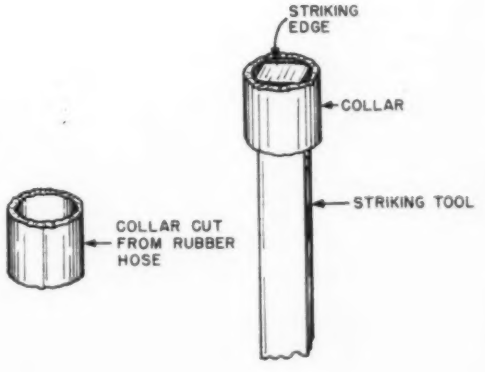
Operator of air drill stands with feet on opposite sides of welded coupling. Drill bit is placed inside coupling before air is turned on. Guide remains in place until hole is drilled deep enough to make further use of guide unnecessary.

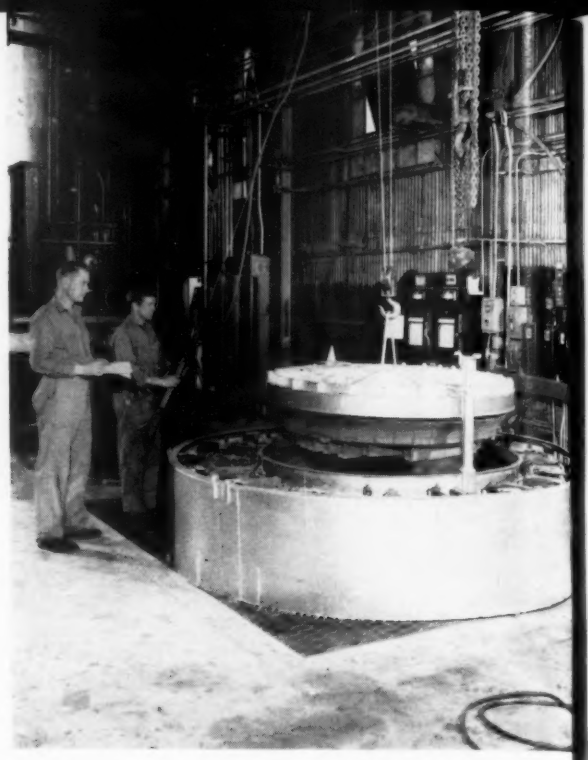


STRIKING TOOL SAFEGUARD

Idea developed by | Richard Dowley
New England Power Service Company

Any imperfection or slight mushrooming of a striking tool can cause a fragment of steel to fly off at high speed when such a tool is struck. This can cause serious injuries to men using the tools. A simple solution to this problem is to protect all striking tools with a collar of rubber hose. Using a short section of hose on such tools as a wedge, star drill, or bull point, will prevent injuries. Burrs on the tool head become imbedded in the hose instead of flying into space. Various sizes of these collars are needed, depending on the size of the tool.





Work loads up to 48 in. diameter and 6 ft length are heat treated under controlled atmosphere in this radiant tube pit furnace. Furnace cover is being lowered into seat.

On West Coast

'Most Modern' Heat Treating Plant Fired by Gas

W. G. Thompson
Southern California Gas Company
Los Angeles, California

THE California Doran Heat Treating Company, Los Angeles, has just completed the installation of a furnace that completes the equipping of the "West's Most Modern Commercial Heat Treating Room."

This room contains the most modern design in controlled atmosphere heat treating equipment, with the necessary auxiliaries, for handling quantity production of small parts in semi-automatic batch furnaces, or parts up to 16 ft in length and 40 in. in diameter (48 in. in certain processes), to a weight limit of 6000 lb net per batch.

The latest unit — the first bottom-quenching furnace on the West Coast available to the trade—was constructed from standard units which they were able to purchase.

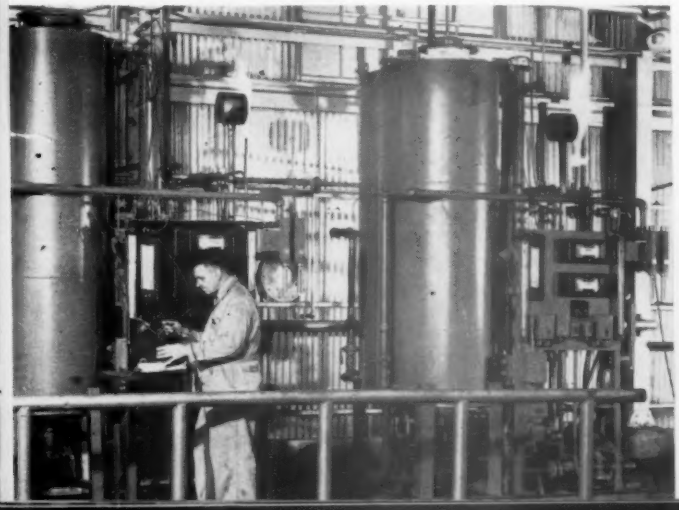
The first units put into operation in this room were three Surface Combustion "All-Case" furnaces. Two of the furnaces are operated in the 1600 to 1750F range for gas carburizing, dry cyaniding, carbo-nitriding, carbon restoration, bright hardening, or any of the other treatments accomplished with controlled atmosphere. One of these high-temperature furnaces is equipped with heating facilities in the quench tank to permit mar-tempering. The third furnace is utilized for tempering operations, thus offering one of the few local sources for complete treatment in the protection of controlled atmosphere.

Batch Furnaces

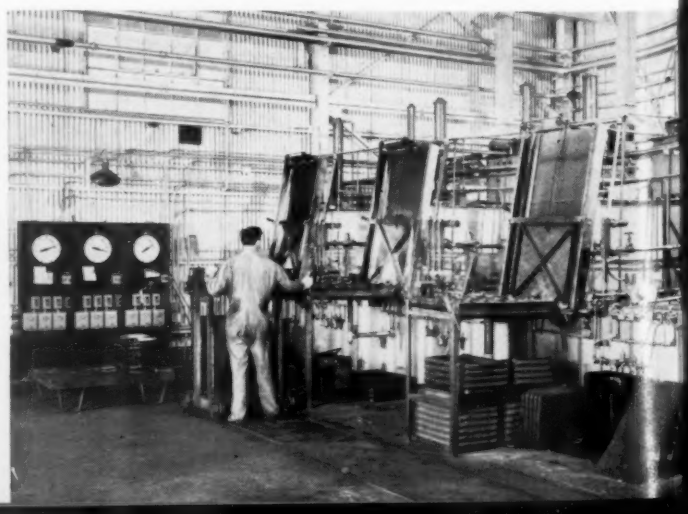
These batch furnaces, each of which has a hearth area of 24-in. by 36-in., will take a work load of 500 lb per heat, and complete the cycle of heating, soaking, and quenching, all under controlled atmosphere. The loaded work basket is pushed into the entry vestibule, which is above the quench tank and is separated from the heating chamber by an internal door. After the vestibule is filled with the controlled atmosphere to purge any air entering with the work, the loaded basket is pushed through the internal doorway into the heating chamber, where the work goes through the heating and soaking cycle. It is then returned to the entry vestibule, where it is lowered into the quench tank.

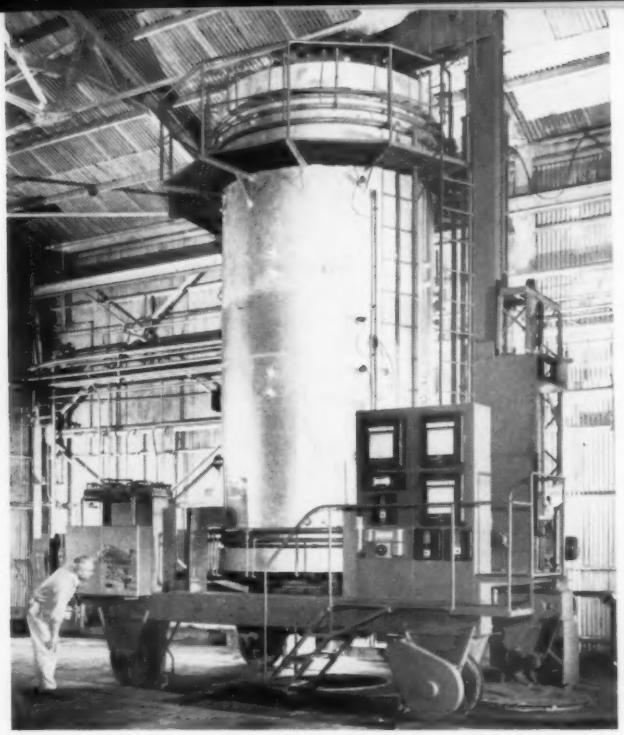
The quenching oil is circulated through and around the work by circulating pumps to insure rapid, even and uniform quenching. The quench elevator is provided with two decks of roller

Dual endothermic gas atmosphere generators with control panels. These units crack a gas-rich natural gas-air mixture inside a retort, which is heated by the combustion of a normal gas-air mixture. Equipment operator is shown making a dew point test.

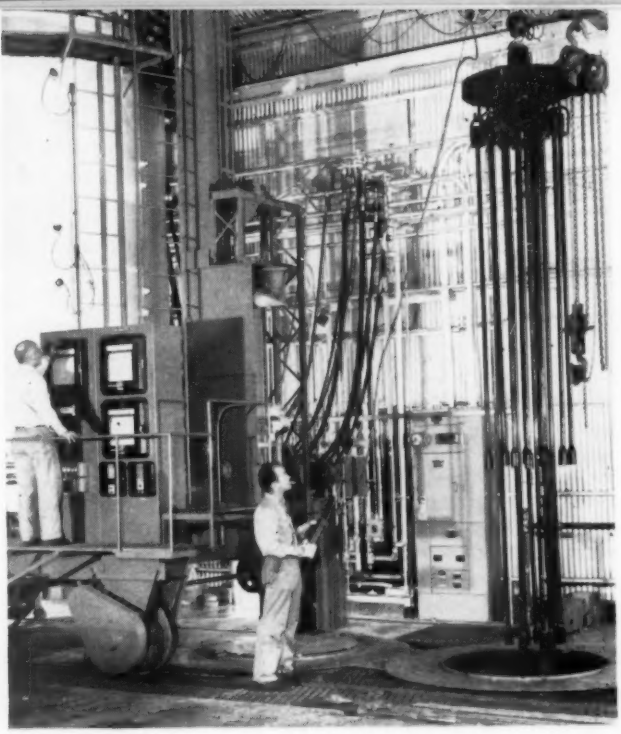


Battery of three gas-fired radiant tube furnaces handles high production of small bulk items under protection of controlled atmosphere.





Gas-fired radiant tube, three-zone tower furnace for heat treating work to 48 in. diameter and 16 ft long. Operation control panel has automatically stopped the car cover the loading pit.



Load of 10 ft and 16 ft torsion bars draining above the cold oil quench tank while furnace car moves back to heating position.

conveyors. These permit a second load to be run through the vestibule into the heating chamber while the first load is in the quench; then while the second load is in the heating cycle, the first load can be raised, drained, and removed, fully hardened and ready for tempering.

Pit Furnace

Second unit to be placed in operation was the pit furnace, for larger and more bulky work. It will handle work up to 48-in. diameter and 6 ft long, suspended from fixtures held in the top of the furnace just below the sealing cover. Loading and unloading are handled by an overhead crane. This furnace also can do bright hardening, gas carburizing, carbon restoration, carbo-nitriding, or any type of heat treating done with a controlled atmosphere. It is also of Surface Combustion design, heated by 16 U-type radiant tubes, with forced convection fan located in the bottom of the furnace. It has single zone temperature control, and either a lining shield or solid wall work baskets are used to control circulation.

'Long Work' Furnace

Crowning achievement in the heat treating room is the furnace for handling long work. Finding nothing on the market that would readily meet their needs, Frank Robison, treasurer and plant engineer, suggested that they adapt and modify standard units. To do this, they took two units similar to their pit furnace; in effect, cut the bottoms out of these units, inverted one for the bottom of their new furnace, and placed the other one above it with a 2 ft extension added in between.

They then put a permanent cover on the top of the upper furnace, placed the whole unit on a motor driven car running on rails in the floor, and then proceeded to build control mechanisms, combustion equipment, piping and elevating mechanism around this shell. The result is a furnace standing 24½ ft high (including the car), with temperature variations of plus or minus 3F throughout the furnace at a controlled temperature of 1550F and plus or minus 4F at a controlled temperature of 1700F.

Three Control Zones

In this furnace there are three zones of control. The bottom one consists of the original bank of 16 U-tubes 6 ft long, which now fire and exhaust from the bottom instead of from the top as in the original design. The top zone consists of one-half of the original 16 tubes in this unit remaining practically as originally installed, and firing and exhausting from the top.

The third zone of control is the other 8-tube part of the top section, that also fires and exhausts from the top. To each of these tubes, two 4-ft legs have been added so that they are now 10 ft long. This carries them down through the section added between the two original furnaces so that the entire inside area of the furnace is provided with heating input.

Heat Control

Since heat naturally rises, the heaviest input can be placed in the bottom. Temperature is controlled by three Leeds & Northrup Model S controllers with DAT proportioning modulation. To assure uniform temperature a fan was placed in the bottom door to give forced convection, and in order to set up controlled currents for the atmosphere, an Inconel liner was placed inside of the radiant tube banks and outside of the working area. The forced convection fan forces the atmosphere up through the annular section around the radiant tubes, and down the center through the suspended work.

Although the Inconel liner is at radiating temperature, it gives a uniform radiating surface that could not be achieved with the radiant tubes exposed to the work load. Tests have shown that all three banks of radiant tubes come under modulation by the controllers at very nearly the same time, showing how closely the heating capacities have been balanced to the furnace requirement.

The rails on which the furnace moves extend from one end of the building to the previously mentioned 6 ft pit furnace. Three pits have been provided between the rails to allow for the quenching and loading operations. The normal working location of the furnace is at the end of the line of rails, opposite the pit furnace, which also allows use of the three pits for loading and quenching with the shallow pit furnace.

Control System

Movement of the furnace and operation of the integral part is controlled by limit switches so interlocked that they can only operate in the proper locations and in proper sequence. For instance, limit switches are placed at each pit so that the car will stop in the correct location for that pit. Only when the furnace is in a correct location over one of the pits can the furnace door be opened.

The chain hoist, which raises and lowers the load, can only be operated when the furnace door is open, and the circulating fan can only be operated when the door is closed. Combustion safeguards prevent operation in case of power failure, air failure, gas failure, or failure of the exhaust fans that provide the induced draft on the radiant tubes. Credit for these control interlocks and many of the other ingenious mechanisms is given to John Dannelley, maintenance superintendent, and staff.

How It Works

In operation, the work is loaded onto the fixture in No. 1 pit and the furnace is then moved over this pit. When the load has been drawn up into the furnace, the door is closed, the furnace is returned to its working position until the heating cycle is completed. It can then be rolled back over the proper quench pit.

The loading pit is equipped to be used as a still water quench, a spray quench with 60F or lower temperature, and air quench with a 35,000 cfm blower, or still air cooling, either open or with the cover in place. The other two pits provide for a hot oil quench or a cold oil quench. Both oil pits are provided with circulating impellers that can, by means of variable speed controllers, move any volume between 400 and 5000 gal per minute.

The oil storage capacity of each tank is 5500 gal so that, in effect, the whole capacity of the tank can be moved past the work each minute. In addition to the capacity of the tank, each unit has circulation to outside storage with provisions for cooling the oil and in the case of the hot oil tank, for heating. When using hot oil, part of the oil is heated above the desired temperature and is then mixed in proper proportion with cool oil to get the control temperature.

Fire Protection

To the layman, the thought of immersing red hot steel in oil creates a mental picture of flames flaring up around the furnace. Ordinarily, the rate of immersion is so rapid that the oil that gets hot enough to burn is drawn down on the metal away from the air necessary for burning. But to assure that the flame picture is never more than mental, a CO_2 fire extinguishing system is provided to blanket the top of the quench tanks. Storage bottles, with total capacity for one hour supply, are connected to the permanent manifold outside of the building where flames cannot make the control inaccessible.

Automatic Furnace Door

The furnace door is automatically controlled and, as previously mentioned, fan control is interlocked so the door cannot be opened while the fan is running. From a closed position, the door drops straight down under the car until it clears the bottom structure of the furnace. It is then rotated from a pivot exterior to the car frame until it is swung completely clear of the furnace opening.

The pneumatic door controls are provided with "safe-failure" interlock so that the door will swing back to position and close in case of power failure. Naturally, when in the closed position, door remains locked if the power fails.

In the open position, the hook and high alloy hoisting chain can be lowered to pick up the load. Limit switches stop the movement of the hook slightly above the loading point, which is also the level where the furnace fixture will rest during the quench cycle. From this limit point the hook is controlled by a job switch to slowly lower it to place where it can either connect or disconnect with the eye on the fixture. When raising the load into the furnace the same procedure is used; the rapid travel is limited by a switch that stops it before the hook comes up against its seat. It is then raised by a jog button to its load carrying position. In this position, the door can then be closed.

'Real Cool' Hoisting Chain

The handling of the hoisting chain is also an unusual installation. The hook is drawn up into a water cooled sleeve that is shielded from direct radiation of heat from the furnace but is open to the atmosphere of the furnace. The top sprockets and the entire chain are enclosed in a gas tight compartment, extending down to the winch. This acts as the vent for the atmosphere gas which is taken to the burn off vent.

As a result of this construction, even when the furnace door is open and the chain is operating, there is almost no loss of the atmosphere gas; there is only a slight burning at the interface where the air can contact the atmosphere gas at the bottom level. If the flow of atmosphere gas is continued, this interface remains at the bottom edge of the furnace, and there is practically no entrapment of air when a new load is drawn into the furnace and no purging cycle or time is required.

The hook and chain also are kept relatively cool, tests having shown that at 1700F operating temperature, the hook is about 800F. This means that the hook and chain can be used at relatively high working stresses since they are at a low temperature level.

Atmosphere Gases

The atmosphere gases can be either endothermic or exothermic. Endothermic gases are produced by 2 Gas Atmospheres, Inc. generators each with 2000 cfh capacity, and one Surface Combustion generator of 750 cfh capacity. Exothermic gases are produced by 2 General Electric generators, 1500 cfh capacity each, and 2 Hevi-Duty Electric Company generators, 1000 cfh capacity each.

Exothermic gases are treated with refrigeration and desiccant to produce a –40F dew point, and CO_2 is absorbed in a Mono-ethanolamine absorber to produce an atmosphere of approximately 10 per cent CO, 5 per cent H_2 and 85 per cent N_2. The endothermic generators are located in the room and the exothermic generators are just outside the wall of the building.

The modern commercial heat treating room is only a portion of the expansion of California Doran Heat Treating Company. Since the time of its founding in 1937, the company has been always on the lookout for new equipment and new methods to put into practice. It is a great satisfaction to the gas industry that for their newest and most modern equipment they have selected natural gas as the fuel.

At the time of its founding, salt bath furnaces were the most modern equipment available. And the company specialized in salt bath units for all high-quality work while using the conventional box type batch furnaces for pack carburizing, annealing, and conventional hardening operations. It also was one of the first companies to install car bottom furnaces for large volume annealing operations.

The firm progressed with the atmosphere furnaces as technology advanced. In addition to the units listed, there is a Lindberg vertical radiant-tube carbonitriding furnace, and a radiant tube controlled atmosphere furnace with a refrigerated atmosphere quench. Doran has also kept pace with the volume type of heat treating. Doran has a number of continuous hardening furnaces, of which a gas-fired roller hearth Knapp furnace with quenching elevator in the conveyor line is the largest, and it has four car bottom furnaces for annealing and normalizing, which are now being supplemented with a pusher hearth furnace that will be capable of handling 3000 lb per hour or that can be adapted to low temperature draw of the same quantity. ★ ★ ★

INTEGRITY and soundness aren't enough to sell a good product these days — you've got to have "showmanship," Zenn Kaufman, noted sales counselor from New York, told the Southern Gas Association's 49th annual convention in New Orleans.

"Business — like burlesque, bullfighting, ballet, boxing, or baseball — is one great continuous show," he noted. "The extent to which you make it a good show — honest, sincere, and entertaining, determines your box office."

Complacency toward selling gas air conditioning and the apparent trend towards electric range sales may put the gas utility industry in the same boat with the public transportation utilities — one that's sinking, cautioned G. J. Tankersley, executive vice president of the Gas Light Company of Columbus. Tankersley told his SGA audience that the gas utilities must sell gas air conditioning not only to increase summer load, but to save their heating load. He suggested they objectively study the problems involved and take a realistic look at the value of the air conditioning load, then set up a positive sales program and talk optimistically about it.

Registration at the big SGA meeting totaled 2047 this year, an increase of 12 over last year's record 2035 in Dallas.

★ ★ ★

New chairman of the Florida-Georgia Gas Association is Joseph Frink, Florida Power & Light Company, Miami, who succeeds A. H. Gaede, Florida Home Gas Company, DeLand. L. A. Friederich, The Tampa Gas Company, Tampa, was elected secretary-treasurer at the group's annual meeting, succeeding Paul J. Crawford, Ocala Gas Company, Inc., Ocala, Florida.

★ ★ ★

Today's expensive dollars may be quite inexpensive 20 years from now, George B. Johnson, president of the Mid-West Gas Association told the group's annual meeting in Minneapolis. Johnson, referring to planning for expansion, noted that the "rule of thumb" methods used in sizing mains, plant, etc., years ago were quite flexible, allowing plenty of room for meeting additional loads today.

In planning such expansion, Johnson noted, the industry must not only use hindsight, but rely more on foresight and keep looking to each side so that it can progress more rapidly than its competitors.

Nearly 500 gas men registered for the three day meeting. New officers elected include Peter C. DeHaan, Iowa Power and Light Company, Des Moines, Iowa, new president; Henry R. Slocum, Central Electric and Gas Company, Columbus, Nebraska, first vice president; R. S. Stover, R. S. Stover Company, Marshalltown, Iowa, second vice president, and Everett E. Baxter, Central Electric & Gas Company, Lincoln, Nebraska, re-elected secretary-treasurer.

★ ★ ★

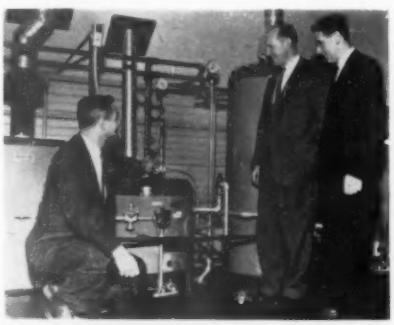
Utilities, like other businesses, have just traveled through 20 "tragic and tremendous years" to arrive at their present peak of accomplishment, C. Hamilton Moses, lawyer and former president of Arkansas Power and Light Company, told more than 1100 delegates to the annual National Conference of Electric and Gas Utility Accountants held in Washington, D. C.

He described the next quarter-century as crucial, with decisions to be made that will shape history for a thousand years. Among coming events he envisioned a population growth of 20,000,000 new families, 25,000,000 new homes, and a gross national product of $1-trillion a year.

★ ★ ★

T. T. Arden, president of the PCGA underscored the association's spring sales conference's theme of "Greater Growth with Natural Gas," by noting that "the gas industry plans to invest at least 933 million dollars by 1960 as part of its expansion program in the West. And, that plans are now in the making that will raise this figure well over the one billion dollar mark before 1960 is reached."

Sparked by the Pacific Northwest gas utilities as area hosts, the conference held recently at Lake Wilderness Lodge near Seattle under the general chairmanship of Burton Larson of Southern Counties Gas Company, was divided into two informative two day sections — "residential" sponsored by Joseph Staller, Southern California Gas Company and "non-residential," sponsored by R. K. Von Der Lohe, Southern Counties Gas Company.



More than 160 persons attended the four 2½-day sessions of a two-week training course on technical and practical phases of water heating sponsored by the Pacific Coast Gas Association through the Washington Natural Gas Company of Seattle, Washington. Instruction was provided by leading water heating authorities. Left to right: R. N. Spear, Ruud Manufacturing Company, one of the instructors; Carl Linde, commercial sales manager, and Barney Poor, vice president and general manager, both of Washington Natural.

★ ★ ★

Clifford V. Coons heads the new slate of officers of the Gas Appliance Manufacturers Association elected at the 22nd annual meeting of the trade group at White Sulphur Springs, West Virginia.

Coons, executive vice president of Rheem Manufacturing Company, will take office as president in October, succeeding Julius Klein, president of the Caloric Appliance Corporation, Philadelphia.

Other officers elected are *first vice president* — Edward A. Norman Jr., president of Norman Products Company, Columbus, Ohio; *second vice president* — Wendell C. Davis, president of Cribben & Sexton Company, Inc., Chicago, Illinois; Stanley H. Hobson, president of Geo. D. Roper Corporation, Rockford, Illinois, was re-elected *treasurer*.

★ ★ ★

On the West Coast increasing demands for natural gas have created interest in underground storage projects. "There appears to be mutual benefit to producer and gas company in exploring all means of development of natural gas storage reservoirs," R. W. Todd pointed out at the Joint PCGA-AGA Transmission Conference in San Francisco.

"Pacific Coast gas industry . . . by 1958 . . . will have invested in excess of 55 million dollars in various underground storage facilities and the necessary pipelines to deliver the gas to and from the storage fields. By 1958, Pacific Coast underground storage facilities will have a daily deliverability of 1295 MMcf per day," Todd added. The 3-day session held early in May and sponsored by the Pacific Coast Gas Association was attended by more than 400 people.

★ ★ ★

Seeing ourselves as others see us wouldn't do much good. We wouldn't believe it.

★ ★ ★

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SU-3

Glossary of Gas Industry Terms–Va to Zo

Valence: A property of atoms determining the number of other atoms with which they can combine in chemical reactions.

Valve: A mechanical device for controlling the flow of fluids; types such as gate, globe, needle, plug and diaphragm valves, are used.

Valve Box: A housing around an underground valve to allow access to the valve and to protect the valve from mechanical damage or the effects of weather.

Valve Chamber: The space in a gas dry-meter containing the slide valves and mechanism for their operation.

Valve Control: A fuel-air ratio control system that operates by means of mechanical linkage of related valves.

Valve Manifold: A piping manifold having several valves connected in the piping.

Vane Blower: A gas-moving mechanical device consisting of one or more movable vanes set into a rotor that is eccentrically mounted in a sealed circular housing. The vanes are spring-loaded to hold them against the inner surface of the housing as the rotor turns. As the rotor turns, gas from the housing inlet is picked up between vanes and rotor, compressed and discharged from the outlet of the blower case or housing.

Vapor: A gaseous state of a liquid brought about by heating, reduction of pressure, or both.

Vapor Density: The weight of a gas or vapor relative to an equal volume of some standard gas at the same temperature and pressure.

Vapor Heating System: A steam heating system operating near atmospheric pressure and returning condensate to the boiler by gravity.

Vaporization: The conversion of a liquid to a gaseous state.

Vaporizing Oil Burner: A burner that vaporizes the oil in a single step, before combustion, by the direct application of heat to the liquid oil.

Vapor Pressure: The pressure caused by vapor over the surface of a liquid in a closed container; caused by the higher kinetic energy of the molecules of vapor.

Vault: An enclosed room or pit having an access opening in the top or side wall, or both. May be in a building, a separate aboveground structure or underground.

Vegetation Surveys: Leakage surveys made for the purpose of finding leaks in underground gas piping by observing vegetation.

Velocity: The number of distance-units a body moves in a unit of time, such as miles per hour or feet per second.

Velocity Pressure: The pressure exerted by a fluid due to its motion, as distinguished from the static pressure exerted against the walls containing the fluid. The total pressure is the sum of the velocity pressure and static pressure.

Vent: An opening in a tank or other piece of equipment, sealed to prevent escape of material within the equipment at normal pressures, but so arranged that it automatically opens to relieve excessive pressure in the equipment. Can also be arranged for manual opening to depressure equipment as desired.

Ventilation: The supplying or removing of air to or from any given space.

Vent Pipes: Pipes used to conduct the discharge of a vent to a suitable location.

Venturi Meter: A fluid-flow meter in which the rate of fluid-flow is determined by measuring the pressure drop caused by the flow of the fluid through a Venturi throat or tube. The pressure drop across the tube is proportional to the fluid flow rate.

Venturi Throat or Tube: A tube tapered down to a lesser diameter in the middle of its length and then expanding gradually to its original diameter. Pressure-measuring taps are provided at the entrance and at the constricted throat for determining pressure differential through the tube.

Vertical Boiler: See: Boiler.

Vertical Retort: A coal gas manufacturing retort with the long axis in a vertical position.

Viscosimeter or Viscometer: A viscosity-measuring instrument.

Viscosity: The resistance of a fluid to flow due to the combined effects of adhesion and cohesion.

Viscosity, Absolute: Measure of fluid-resistance to flow, irrespective of density. Equal to the kinematic viscosity multiplied by the density of the fluid. Also called dynamic viscosity.

Viscosity, Kinematic: Measure of fluids' relative resistance to flow, including the density effect of the fluid.

Viscous: Having a high viscosity.

Volatile Still: A still used to recover ammonia from coal gas wash water by heating the ammoniacal liquor and driving off the ammonia.

Volatility: The relative ease with which a liquid can be vaporized.

Volt: Measure of electrical "pressure" or electro-motive force. Mathematically, it is the product of electrical resistance and electrical current. Volt = Resistance × Current.

Voltmeter: A direct reading instrument for determining the voltage.

Volume, Combustion: The volume occupied by the flame and invisible combustion zone of a burning fuel.

Volume Flow Rate: The number of unit-volumes of a fluid flowing past the measurement point in a unit of time, such as gallons per hour or cubic feet per minute.

Volume, Specific: The volume of a unit weight of a substance at specific temperature and pressure conditions.

Volumetric Efficiency: Ratio of the volume of fluid discharged from a pump or compressor to the volume displaced by the piston.

W

Wall Loss: Loss of heat through the walls of a furnace or tank.

Warm Air Heating System. A heating system consisting of a furnace enclosed in a casing from which ducts distribute heated air to various rooms of a building. When air flow through the system is caused by difference in weight between heated air and cooler return air, it is a gravity system, a forced system has a fan or blower to

move the air; a perimeter system discharges warm air at floor level around the outside walls of the building and collects return air at ceiling level at interior walls.

Warm-Up Time: The time required to heat a furnace, boiler or other equipment to the operating temperature.

Wash: Removal of impurities from a gas or vapor by passing the gas through water or other liquid, which retains or dissolves the impurity.

Wash Box: A part of a carbureted water gas set, consisting of a partially water-filled, gas-tight box through which the gas from the generator is passed to wash out impurities. Also acts as a water seal to prevent return of gas into the water gas set.

Washer: A shell with internal baffler or packing, so arranged that gas to be cleaned passes up through the baffles counter-current to the flow of scrubbing liquid down through the washer. The baffler or packing cause intimate contact and mixing of the gas with the liquid stream.

Washer Cooler: A washer, in the form of a tall tower, in which the washing liquid is sprayed in at the top, is collected in the bottom of the tower, and then is cooled and recycled through the tower. Serves a dual purpose of washing the gas free of impurities and also cooling the gas.

Waste: Uncompensated loss. Also, a mass of wool or cotton threads used to clean machinery.

Waste Gas: The gaseous combustion products, such as carbon dioxide and nitrogen, that leave the combustion zone and are discharged to the surrounding atmosphere. Also called stack gas or flue gas.

Waste Gas Flues: Pipes, passages or ducts connecting a combustion chamber to a draft stack or chimney.

Waste Heat Boiler: A heat exchanger set into a flue or stack. Water is passed through the exchanger and converted to steam by the heat of the flue gases. This heat would otherwise be lost up the chimney.

Water Gas Reaction: When steam is passed through an incandescent coal or coke bed, a chemical reaction occurs in which the steam is disassociated to hydrogen and oxygen. The oxygen reacts with the carbon of the coal or coke to form carbon monoxide. The resulting mixture of hydrogen and carbon monoxide is known as blue or water gas.

Water Gas Tars: Tars produced from cracked oil vapors in the carbureted water gas manufacturing process.

Water Gage: A device to measure the amount or level of water in a tank or boiler; alternately, a pressure measuring device, usually a "U" tube, for determining small pressures in inches of water.

Waterless Type Gas Holder: A large cylindrical, vertical shell containing a gas-tight, movable piston that moves up and down as gas is pumped in or out of the shell.

Water Level Shut-off Control: An automatic device that shuts off the fuel to a boiler or water heating plant when the water level falls below a pre-determined minimum.

Water Pan: An open water container placed inside a furnace warm air heating system. As the heated air passes over the pan, water evaporates and raises the humidity of the air to the desired condition.

Water Seal: A device, containing water for prevention of gas flow. Sometimes used to prevent flow altogether, sometimes to prevent flow other than in one direction, sometimes used as a safety blow-out. Basically, it is a gas-tight container, partially filled with water, having one pipe connected into the shell and another pipe passing through the shell and extending below the water level.

Water Sealed Gas Holder: A low pressure gas holder consisting of cylindrical sections or lifts telescoping into a water-filled pit or tank, with the inside section closed in on top. As gas is admitted under the inside section, it floats up in the water, carrying successive outside sections up as it rises, by means of cupped lower outside edges of each section engaging hooked upper inside edges of the next section. The guide framework around the sections stops the upward motion before the last, or outer, section leaves the water.

Water Tubes: Heat exchange equipment in which water flows inside tubes to exchange heat with another fluid surrounding the tubes is called water tube equipment and the tubes are called water tubes.

Watt: A practical unit of power and is produced when one ampere flows under an electromotive force of one volt.

Weight: Force of attraction of the earth for a body, measured in units of mass such as pounds, grams or ounces.

Weighted Governor: See: Loaded governor.

Weight Flow Rate: The number of unit weights of a material flowing by the measuring point in a unit of time, such as pounds per hour or tons per day.

Weight, specific: Weight of a unit volume of a substance.

Weld: To join two pieces of similar metal together by depositing molten metal of the same kind on the edges of the joint in a manner that produces a homogeneous unit of deposited metal and melted edge metal.

Welded Pipe: Skelp shaped into tubular form and welded along the edges to form a tube or pipe.

Welding Rods: Special composition metallic rods used for making welded joints.

Well: A hole drilled into the earth to tap underground reservoirs of oil, gas or water.

Well Casing: Steel pipe used to line a well.

Well Rig: All the equipment required to drill, case and finish a well.

Welsbach Mantle Lamp or Incandescent Mantle Lamp: A type of lamp in which the flame impinges on a knitted cup or mantle saturated with certain chemical compounds that are heated to incandescence and emit a bright, white light.

Wet Bulb Temperature: Temperature indicated by a thermometer having a water-saturated wick surrounding the bulb. When this is moved rapidly through the air as with a sling psychrometer, the evaporation of water from the wick cools the thermometer. The temperature reading obtained is indicative of the amount of water vapor in the air.

Wet Drum Meter: A large-capacity gas meter consisting of a cylindrical drum mounted to revolve inside a shell half-filled with water. Spiral partitions divide the drum into four sections along the axis. The water prevents the gas from by-passing the drum and the gas forcing through the spiral chambers rotates the drum proportionately to the quantity of gas passing through the meter.

Wet Natural Gas: Natural gas that contains readily condensable gasoline. A fraction of a gallon to as much as 10 gal or more has been extracted from 1000 cu ft of wet gas by actual field tests.

Wet Steam: Steam containing some condensed liquid water in the form of a mist.

Wind Furnace: Natural draft furnace.

Work: The application of force to cause motion or change of motion.

Working Pressure: The pressure at which a piece of equipment normally operates.

Wrapped Pipe: Pipe that has been covered with a chemically inert compound and a protective layer of fiberglass or kraft paper to cover the coating compound and keep it in place.

X

Xylene: A coal tar derivative, higher boiling and slower evaporating than benzine or toluene.

Y

Yield: The amount of desirable product obtained from a process or operation. Sometimes expressed as a percentage of the material used in the process.

Yield Strength: The strength at which a material exhibits a specified limiting permanent set, or produces a specified total elongation under load. The specified limiting set or elongation is usually expressed as a percentage of gage length, and its values are specified in the various material specifications acceptable under this code.

Z

Zero, Absolute: A state of matter in which there is no molecular motion and equal to —273.18 C or —459.72 F. Under the general law of gases, a gas would have zero absolute pressure at absolute zero.

Zero Gas: Gas at atmospheric pressure.

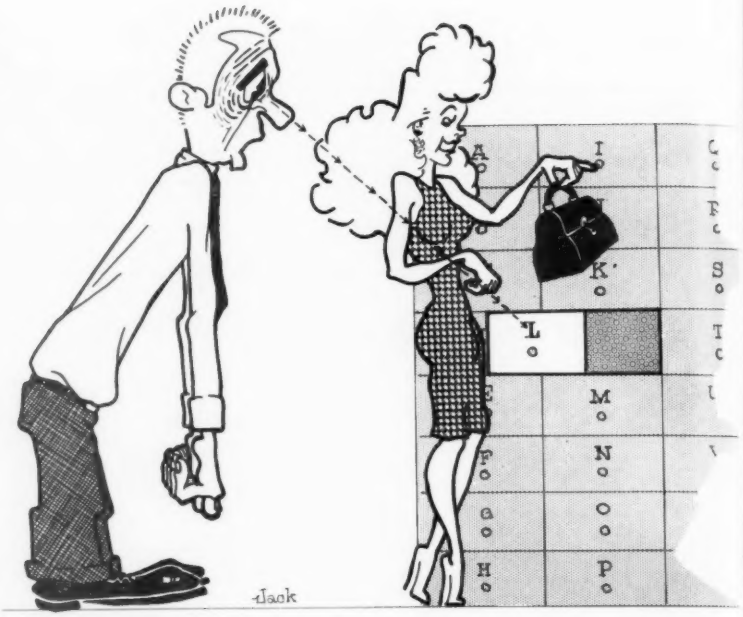
Zone, Control: Sections of heating equipment, such as a furnace, oven, still or boiler, in which the temperatures are individually controlled by instruments that actuate fuel valves in accordance with the specific process cycle requirements for time or temperature or a combination of both.

Abbreviations and Symbols

Allow. allowable
Abs absolute
A-C alternating current
Air hp air horsepower
Approx. approximate
Atm atmosphere
Auto. cir. tank automatic circulating tank
Auto. inst. automatic instantaneous
Auto. pilot automatic pilot
Auto. stg. automatic storage
Avdp. avoirdupois
Bar. barometer
B G blue gas
B H P brake horsepower
B H P-Hr brake horsepower hour
B P boiling point
Btu British thermal unit(s)
CFM or cfm cubic feet per minute
C.I. or c.i. cast iron
Cir. tank circulating tank
COG coke oven gas
CP certified performance
cu ft cubic foot or cubic feet
cu ft/hr. cubic feet per hour
c.v. calorific value
CWG or CW gas carbureted water gas
deg degree
d density
C degrees Centigrade
F degrees Fahrenheit
diam. diameter
dist. distribution
DMS drill manufacturers' size
eff. efficiency
emf electromotive force
F.O.T. fuel cost plus oil cost minus tar credit
fpm feet per minute
ft-lb foot-pound
gpm gallons per minute
H.P. high pressure or horsepower
HP-HR horsepower hour
ID or I.D. inside diameter
in-lb inch-pound
L.P. low pressure (under 10 in. w.c.)
LPG or LP gas Liquefied Petroleum Gases
max. maximum
Mcf thousand cubic feet
mfd. manufactured gas
MM millimeters
min minute(s)
min. minimum
mol. wt. molecular weight
mph miles per hour
mv millivolt(s)
Nat. gas natural gas
Non-auto. stg. non-automatic storage
OD or O.D. outside diameter
Oper. rev. operating revenue
PG producer gas
PSI pounds per square inch
PSIA pounds per square inch absolute
rpm revolutions per minute
sat. saturated
sec second
sp gr specific gravity; air = 1.0
sp ht specific heat
temp. temperature
T.R. or t.r. temperature rise
V volume
w.c. water column
W.I. or w.i. wrought iron
wr't. wrought

A Area of section, in square feet.
C^1 Orifice flow constant.
D_1 Diameter of pipe at upstream pressure connection, in inches.
D_2 Diameter of orifice, in inches.
F_b Basic orifice flow factor.
F_g Specific gravity factor.
F_{pb} Pressure base factor.
F_{pv} Supercompressibility factor.
F_r Reynolds number factor.
F_{tf} Flowing temperature factor.
F_{tb} Temperature base factor.
G Specific gravity of flowing gas; dry air = 1.000.
g Acceleration due to gravity, in feet per second^2.
h Differential head in terms of the flowing fluid at the average density at the upstream pressure connection, in feet.
h_w Differential pressure, in inches of water.
K Coefficient of discharge, including velocity of approach.
k Ratio of the specific heat at constant pressure to the specific heat at constant volume.
N Difference between the actual and the theoretical density of P_f expressed as a decimal fraction of the theoretical density.
P_b Absolute pressure at reference or base condition, in pounds per square inch.
P_{f_1} Absolute static pressure at upstream pressure connection, in pounds per square inch.
P_{f_2} Absolute static pressure at downstream pressure connection, in pounds per square inch.
Q_h Quantity rate of flow at base conditions, in cubic feet per hour.
Q_f Quantity rate of flow at flowing conditions, in cubic feet per hour.
Q_s Quantity rate of flow at flowing conditions, in cubic feet per second.
R_d Reynolds number at plane of orifice.
T_b Absolute temperature at reference or base condition; Fahrenheit temperature + 460.
V_f Velocity of fluid at plane of orifice in feet per second.
x Ratio of differential pressure to static pressure at upstream pressure connection.
Y_1 Expansion factor, based on upstream static pressure.
Y_2 Expansion factor, based on downstream static pressure.
Y_m Expansion factor, based on intermediate static pressure.
β Ratio of orifice diameter to upstream diameter.
μ Absolute viscosity of flowing fluid (assumed as 0.0000069 for natural gas at 60 F.), in pounds per foot second.
ρ Density of gas at flowing conditions, in pounds per cubic foot.
ρ_a Density of dry air at 14.70 pounds per square inch absolute pressure and 32 F., in pounds per cubic foot.
ρ_b Density of gas at pressure P_b, in pounds per cubic foot.
ρ_w Density of water at 60 F., in pounds per cubic foot.

How To Make the Most of Your Filing System



Ernest W. Fair

PERHAPS one of the reasons why many gas utility executives are bald is from frequent tearing at their hair during a crisis when something was needed from the files and it could not be located in its proper place because of misfiling.

There is no greater waste of time or money in the average office than through such improper return to the files or misfiling in the first place.

How to prevent misfiling? There's no sure and certain system but there are a number of rules that can be laid down in any gas utility office that will materially reduce such misfiling; sufficiently, in fact, to change it from a time and profit waster to only an occasional annoyance.

In paragraphs to follow, from a great deal of actual trial and error experience in every type of office, are the suggestions that can curb this situation.

Impress on everyone in the office that filing is a skilled job and there's a great deal more to it than placing a folder in an alphabetical location. Make it a rule that no one shall have access to the files except the authorized file clerk or other individual.

Set up an area of responsibility in all file usage. Devise a mimeographed or printed form to use whenever anyone takes something from the files. Have space thereon to show who received the material, the date and time and where it is to be taken. A line for time of expected return has been found to materially increase prompt replacement. Have the individual sign this form **EVERY TIME** and make the rule apply to even oneself or assistant.

Specify that, should any material be removed by anyone when the file clerk is absent, it is not to be replaced in the files by that individual but left on the filing clerk's desk for that person to re-file.

Establish a fixed rule as to how material is to be filed with respect to the file guides, i.e., in front of or behind these guides. In some cases the rule specifies that current material is to be filed behind the guides while transferred material is to be kept filed in front.

Keep the "dead wood" out of the files and thus reduce the possibility of this material serving as a blanket under which to hide needed material. The files should be gone through minutely every six months (at least) with the purpose of removing all expired material for transfer to permanent storage files or to be destroyed.

Provide a tray or other receptacle by each filing cabinet and label it as the place wherein all returned material is to be placed by members of the office staff. It has been found in actual practice that well meaning attempts to return material seldom occur when such a tray is at hand. Where no such provision has been made an individual is much more apt to try to re-file the folder he or she has used with the customary piece of misfiling the result.

Fixing definite filing responsibility should apply to every phase of filing and particularly to the proper placement of new papers and other material that are to go into already established file folders. A great deal of misfiling occurs at this point. Setting up definite procedure as to what is to be done and who is to do it will eliminate most such mistakes.

Run a weekly check up (even if only a spot check) to make sure that the foregoing hasn't occurred inadvertently. It's much easier, and less expensive, to correct these mistakes at such a time than to try to locate a misfiled memorandum when it is urgently needed. Many offices establish this as a duty of the file clerk during periods when his or her work has slacked off. It's a good way to keep files in order all of the time.

Keep the files accessible to everyone in the office. The more centrally located they are, the easier it will be to use them. Such location also helps reduce misfiling since it cuts down time required to obtain something needed in a hurry. Haste always leads to mistakes; in filing it is as true as in any other office procedure.

Have a work table near the files. This permits much more orderly use of the material therein by everyone. It also makes it possible for the employee needing only certain data or information to have a place to jot this down on a memo pad — rather than carry the

folder back to his or her desk and probably return it much, much later. It also gives more people greater use of all material in the files during any given hour, since less material has been taken away to desks scattered throughout the office. The more data is kept in or close to the files the less chance for misfiling.

Be certain there is plenty of light around the files. Bad lighting encourages mistakes; often makes it almost impossible to be accurate and correct. Even the best filing clerk or other office employee cannot help but make mistakes when files are kept in a dark corner of the office or the light is so dim he finds it difficult to locate the proper spot for return of materials or folders.

Don't overcrowd files. Overcrowded files can never be orderly and neat. They encourage further disorder and disarray and make it virtually impossible for a high degree of accuracy to be maintained in any filing cabinet. The cost of an extra filing cabinet can very quickly be lost through continued inaccuracies and mistakes — all involve time and labor costs at the very least.

Establish a definite filing system and make it an iron bound rule that there are to be no deviations from this system. Should difficulty in its use arise as the result of some unforeseen situation, rule out any decision as to what is to be done by personnel. Specify that the problem is to be brought to the person in charge or the executive and decided by that individual and no one else.

Leave room for expansion in every file drawer. This not only avoids overcrowding but permits easier and smoother handling of material therein and thus reduces the chance for error. It also assures that there will be plenty of space available for handling any bulky material which may suddenly arise and that should be immediately filed.

Provide sufficient guides for every possible purpose. Any file can get into a mess when substitute guides have to be created on the spot or short cuts resorted to in order to accommodate new filing situations that may arise from time to time.

Provide facilities for sorting work before filing and make certain these permit the clerk involved to do it in a leisurely manner. Vital single sheets of data can easily become lost in a file where the clerk must work from a stack atop the filing cabinet being used or must file in a tall stack of such individual memoranda with too little alloted time in which to do so. ★ ★ ★

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Merchandising News

Action packed display promotes "No Moving Parts" refrigerator. Although Servel freezes with no moving parts, there's plenty of motion in the new demonstrator display designed to help retail salesmen sell the refrigerator. As E. A. Nash, general sales manager of Home Appliance Division of Servel points out, the display has three types of buyer-attracting motion — first, a flashing light directing attention to Servel's exclusive "automatic ice maker"; second, diamond-shaped "mobile," plugging the modernity of gas, that is suspended at one side of the display and twirls with each air current. And, a revolving drum changes background of a model kitchen illustration to show how Servel's "color-balanced styling" harmonizes with any kitchen decoration.

No tired blood in this PEP Campaign — Sales of commercial gas cooking equipment set a new record during the 1956 PEP Campaign conducted in Houston by United Gas and Houston Natural Gas in cooperation with nine equipment dealers. Equipment sold during the campaign was valued at $136,000 compared with $36,000 worth of equipment sold during the first drive in 1953. Equipment sold represented a total of 28 million Btu capacity. This year's sales represented a 40 percent increase over commercial gas cooking equipment sales during the three-month PEP campaign in Houston last year.

Temco is now in production on a new Thru-the-Wall vented heater. New unit is vented outdoors directly through the wall, requiring no chimney or flue. Outdoor air is drawn into the unit for combustion, with no oxygen depleted from the room. To install, an 8-in. hole is cut through the wall, and unit is hooked up to the pre-engineered vent and the gas line. No electrical connection is required.

Push-Button Selling for a Push-Button Era is theme of a broad new marketing campaign now being initiated by John Wood Company's Heater & Tank Division. Encompassing all aspects of advertising, sales promotion, and merchandising, the plan is designed to fit needs of firm's wholesalers, plumbers, and dealers. Specially trained factory promotional crews will analyze key areas, set up advertising and sales programs, and work with the wholesaler to assure retail coordination and immediate sales. Kits describing the Push-Button Plan are available to plumbing and heating dealers.

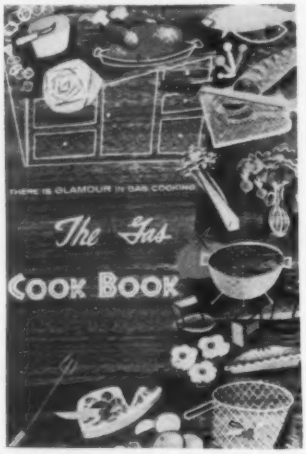
Small Absorption Cooling Units Introduced by Carrier

Two new smaller sizes of Carrier Corporation's automatic absorption refrigerating machines, which use heat energy to produce cooling, have been announced. The unique machines, previously available in a range of models developing 100 to 700 tons of capacity, now will be produced in 60 and 80 ton sizes.

Introduction of the smaller models makes available for the first time the absorption cooling machine to a large number of stores, supermarkets, small office buildings, and light manufacturing concerns.

AGA Recommended Book Shows How to Cook With Gas

"The Gas Cook Book," an excellent cookbook of the pocket type, is currently available at quite reasonable prices from a printer in St. Louis, and shows how to put glamour in gas cooking.



Although the book was not produced by the American Gas Association, it was compiled by a leading AGA member gas company that has used it for merchandising promotion with great success. Mary Louise Bohn, home economist, prepared the book and its recipes.

Space on the back cover of the book can be imprinted with the company name.

Orders should be made directly to the printer: Milliken Publishing Company, 1624 Forest, St. Louis 10, Missouri. Price structure runs from $.185 each for orders of 100 to 500; $.17 each for 600 to 1000; to $.14 each for orders of 26,000 to 100,000.

Of 172 houses entered in the Owens-Corning Fiberglas national low cost comfort test to determine average heating and air conditioning costs, 76 percent are heated with gas. Fourteen of the houses are both heated and cooled by gas. Fifteen percent of the dwellings are heated electrically and nine percent by oil. Preliminary figures compiled on the first 120 houses in the program indicate heating and cooling costs for all climates of the U. S. averaged $10.64 monthly. All house plans have been carefully screened for "comfort engineering" requirements. Some 65 utility companies and 160 builders in 81 cities in 29 states are cooperating in the program. The utility companies are installing sub-meters to isolate costs of heating and cooling.

School directors attending first annual convention of Ohio State School Board Association in Columbus, visited Ruud Manufacturing Company's commercial gas water heater exhibit of a trio of units designed to meet various hot water requirements in schools. Left, Bert Miles, F. F. Leonard Company, Ruud representative in Columbus, points out two-temperature water service to Mr. and Mrs. Wilbur Ault, members of the Edison school board. E. Genser, kneeling, commercial representative of Ohio Fuel Gas Company, and Jack Ernst, Ruud representative in northern Ohio, look over new Model AS 20-80 used in school work as a temperature booster for supplying 180 F water for dishwashing machines.

Hardwick Presents '57 Model Built-In Burner Units

Hardwick Stove Company, Cleveland, Tennessee, has announced their new 1957 built-in burner units. Finished in white enamel, coppertone, or stainless steel, these surface units match the accompanying built-in ovens.

The top of the Hardwick burner unit fits flat on the kitchen counter, and is wedged in with a molding of stainless steel. The recessed control panel is designed to prevent accidental bumping. Hidden from view is the gas-saving Pin Point Pilot. Also available are such luxury features as the new Thermal Eye burner.

Six new gas-fired wall heaters are now being manufactured by The Coleman Company, Inc. All models are approved under the new 1957 AGA requirements. Four single wall heaters including two with rear register attachments, and two dual wall units make up the 1957 Coleman line. All are designed to fit between wall studs on 16-in. centers. Single wall units have input ratings of 25,000 and 36,000 Btu. Dual wall models are rated at 50,000 to 62,500 Btu.

Automation in cooking has really "ar-rived." One of the most startling innovations in cooking progress is the exclusive new Tel-a-Tronic signal center on the Gaffers & Sattler automatic gas range for 1957. Tel-a-Tronic signal center shows housewife "what's cooking" in and on the range. Instead of colored lights and confusing signal devices, the new control spells out exactly what is happening in the various sections of the range. Panel has seven sections each of which lights up and flashes messages individually, according to its function. When none of the lights are on, frosted glass panel is blank, otherwise the sharp clear lettering on each of the sections shows the housewife the following: Rotisserie Oven On; Oven Ready; Automatic Griddle On; Automatic Griddle Ready; Empty the Grease Saver; Roast is Ready.

SKINNER-SEAL
SERVICE SADDLE

FOR MAKING
SERVICE CONNECTIONS
—QUICKLY, EASILY!

Made of malleable iron. Single massive bolt. All sizes, 1/2" to 12" inclusive. For steel, cast iron and Transite pipe.

M. B. SKINNER COMPANY
SOUTH BEND 21, INDIANA, U.S.A.

SKINNER-SEAL SERVICE SADDLE

1957-58 New England Gas Association officers, left to right, front row, are Edgar G. Rhodes, incoming president; Fred H. Faulstich, retiring president; Andrew W. Johnston, first vice president. Back row, left to right, are G. R. Copeland, second vice president; Otto Price, treasurer, and Clark Belden, clerk.

Rhodes Elected NEGA President for 1957-58

E. G. Rhodes, president and general manager of The New Britain Gas Light Company, was named president of The New England Gas Association at the group's annual meeting in Boston.

Nearly 750 gas utility and manufacturer personnel attended the two-day session in the Hotel Statler, which registrants called "one of the best ever."

Featured on the program were many of the industry's outstanding leaders and personalities, including C. H. Zachry, AGA president; Julius Klein, GAMA president; Allen Schrodt, PAR Plan director; Julia Meade, Gas Industry TV Program Commentator; T. H. Lane, senior vice president of AGA's advertising agency, Lennen & Newell; Harold Massey, GAMA managing director, and Leon Ourusoff, chairman of AGA's air conditioning task group.

Other officers elected for the 1957-58 NEGA association year included *1st vice president,* Andrew W. Johnston, vice president of gas operations, Boston Gas Company; *2nd vice president,* G. R. Copeland, president, Algonquin Gas Transmission Company; *treasurer,* Otto Price, vice president, accounting, Boston Gas Company, and *clerk,* Clark Belden, managing director of NEGA.

Elective directors for the coming year include D. E. Breckenridge, president, Breckenridge, Inc., Boston; A. L. Dowden, supervising engineer, public utilities, Liberty Mutual Insurance Companies, Boston; J. J. Dowling, vice president, The Connecticut Power Company; E. F. Kennedy, general superintendent of distribution, New England Electric System, Gas Division; E. F. Kloer, assistant to president, Worcester Gas Light Company; W. H. Kramer, distribution manager, Phillips Petroleum Company, New York; C. F. Machen, assistant to president, Boston Gas; S. F. McCallister, vice president of operations, Manchester Gas Company; H. C. Moore, Jr., vice president, NEGEA Service Corporation; H. J. Patterson, president, Lowell Gas Company, C. W. Provonchee, vice president, Providence Gas; H. H. Skinner, president, Skinner & Company, Inc., Boston; J. D. Stone, vice president, Gas Incorporated, Lowell; R. D. Stuart, Jr., president, Blackstone Valley Gas & Electric; E. G. Twohey, president, New England Electric System, Gas Division; G. J. Williams, executive vice president, The Connecticut Light & Power Company.

Ex officio directors include immediate past presidents F. H. Faulstich, vice president, Springfield Gas Light Company and H. E. Ayer, executive vice president of Lynn Gas and Electric Company.

Servel Shows $631,628 Loss In First Fiscal Quarter

First fiscal quarter operations of Servel, Inc., resulted in a loss of $631,628 after providing reserves of $241,534. This year's first quarter loss compares with a loss of $235,818 in the opening quarter of 1956.

Servel's first quarter is traditionally a loss period, as it is with other companies in the refrigeration and air conditioning industry, stated the March report to stockholders. "Yet civilian operations for the first quarter of 1957 resulted in the smallest loss of any first quarter since 1949."

Servel's net sales for the first quarter of 1957 totalled $3,732,637, including $2,435,874 in civilian sales and $1,296,763 on defense sales. In 1956, the first quarter sales total was $12,765,103, including $5,448,264 in civilian sales and $7,316,839 in defense sales. Most of the decline in first quarter civilian sales volume was due to the absence of anticipatory buying by gas utility companies, which contributed approximately $1½ million to 1956 volume, and to the discontinuance of several products. The decrease in defense sales volume was attributed to the completion of major contracts and to changes in government aircraft requirements.

During 1956, the second year under new management, Servel substantially reduced its operating loss. The net loss for the fiscal year ended October 31, 1956, amounted to $1,833,217, as compared with a net loss of $4,047,292 for the 1955 fiscal year and a net loss of $8,157,766 for the 1954 fiscal year.

Equitable Gas Company Wins "Excellence In Management"

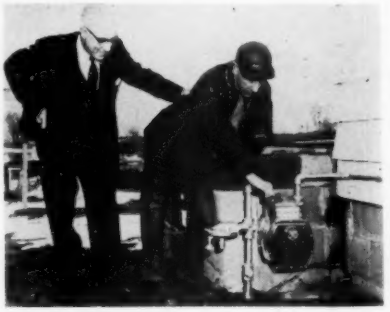
Equitable Gas Company, Pittsburgh, Pennsylvania, has won a rating of "excellence in management" from the American Institute of Management, a non-profit management research organization.

Seven years after a Securities and Exchange Commission order released control of Equitable to the public, the Pittsburgh company has shown what it can do in the face of somewhat unusual competition for a utility. Equitable was one of the first utilities in the country to store its surplus natural gas in underground facilities like abandoned oil wells, and it has pioneered the establishment of subsidiaries like hydrocarbon production.

Equitable scored 8250 points of a possible 10,000 on the Institute's comparative rating scale which measures companies against their own performance, against their competitors and against business as a whole. Minimum for excellence is 7500 points. Health of Earnings is only one of the 10 basic categories under which the Institute appraises a company's management performance.

Another pioneering effort is Equitable's establishment of a department for economic and management research. Much credit for direction of these policies must go to Albert W. Conover, president, the Institute finds in its appraisal of Equitable's executive team. Conover is slated soon to become president of the American Gas Association.

As further evidence of forward looking policies, the Institute cited Equitable's leadership in promoting sale of gas appliances, which has given a more than normal share of business in this field against the competition of the electrical appliance companies.



Gold Meter Marks Iowa Power's 100,000th Gas Meter Installation. N. Bernard Gussett, President of Iowa Power and Light Company (left), watches connection of a gold meter at the start of recent ceremonies honoring Mr. and Mrs. C. A. Myers, Des Moines couple whose new gas meter was the 100,000th installed by the 100 year-old firm. The Des Moines Gas Company, forerunner of Iowa Power and Light, was organized in 1857.

Heaviest backlog of orders in the 16-year history of Servel's "all-year" gas air conditioning division has been reported. Popularity of the new 3½-ton "Sun Valley" heating-cooling unit, first introduced last year, has made it necessary for Servel to add a partial second shift in the air conditioning division.

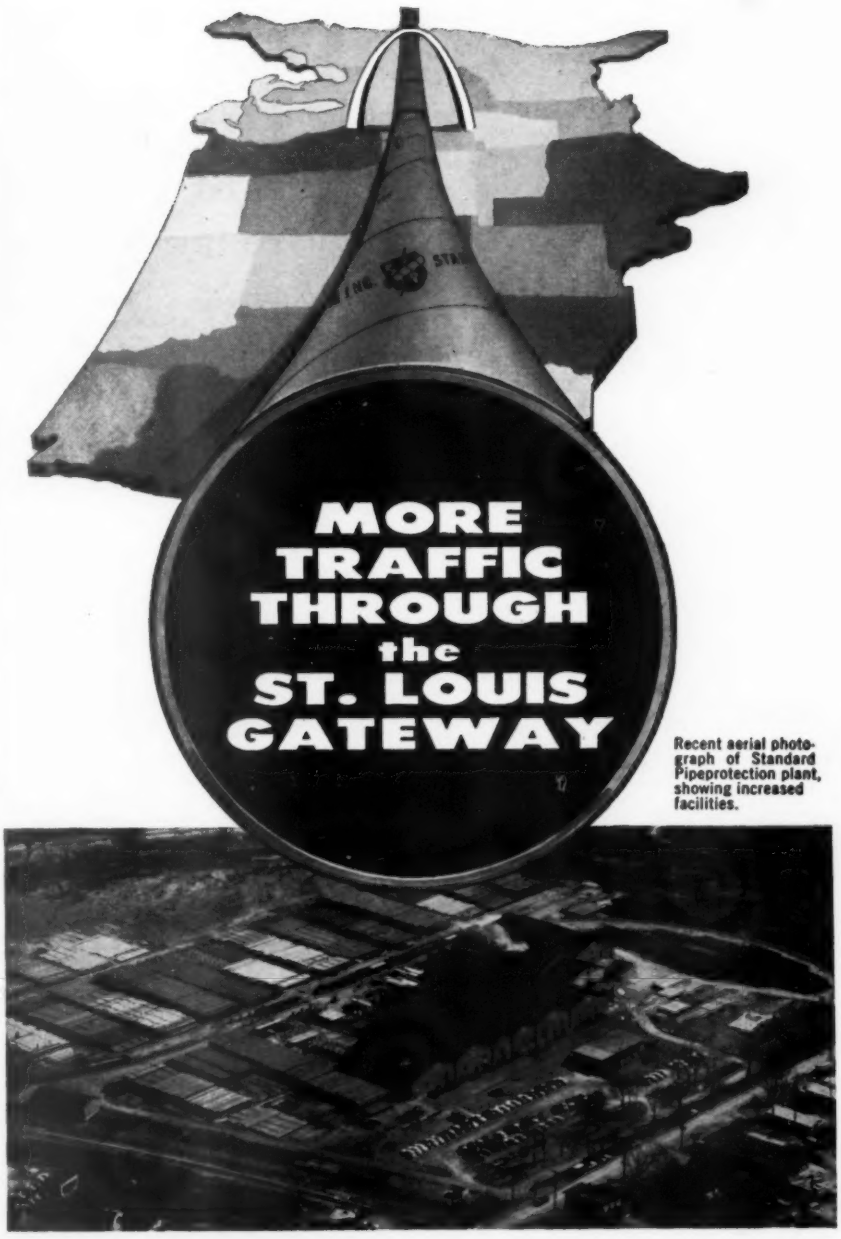
A Crawler yes, but what a pick-up! When the first Terratrac crawler tractor rolled off the assembly line at J. I. Case Company's Burlington, Iowa, Works recently, Frank J. Palermo, plant manager, demonstrated the effective pick-up of the ⅝ cu yd Model "320" crawler-loader by offering pretty Ruth Ann Booten, company secretary, a ride up front in the bucket. Case's Burlington plant has been converted from agricultural combine and elevator production to the manufacture of industrial wheel and crawler tractors, together with a full line of mounted equipment, following the merger of Case and American Tractor Corporation. Larger TerraTrac crawlers, from 62 to 100 hp, will continue to be built at Churubusco, Indiana, plant.

Hall of Flame—For outstanding contributions to the American Gas Association's industrial and commercial division, Walter E. McWilliams, industrial sales manager of The Peoples Natural Gas Company, has been awarded an honorary lifetime membership in the AGA Industrial and Commercial Hall of Flame.

New Gas Approvals Laboratory has been established in the new $100,000 wing of the British Columbia Research Council building on the University of British Columbia campus as a result of a grant from the provincial department of public works. This laboratory makes available to manufacturers of gas burning equipment the most up-to-date laboratory facilities of this kind in Canada.

Name Change — Officers of Milwaukee Gas Specialty Company have announced a change in corporate name of this 44-year-old builder of controls for gas burning appliances. The company name is now Baso, Inc. and was adopted from the company's trademark Baso.

Gas Association Extends Helping Hand — Dr. E. M. Schoenborn, Jr. (left), head of the North Carolina State College Department of Chemical Engineering, looks on as Earl Connolly of Reidsville (right), president of the Southeastern Gas Association, passes along a check for $500 to David W. Abee of Rutherford College. Abee, a freshman in the college's chemical engineering department, is the first recipient of the association's E. E. Randolph scholarship.



Recent aerial photograph of Standard Pipeprotection plant, showing increased facilities.

Each successive year more pipe passes through the St. Louis Gateway, where at Standard Pipeprotection it is coated and wrapped according to procedures that establish the highest standards of quality for pipe protection.

This increased traffic has necessitated the erection of extra pipe storage areas with greater capacity, additional railway sidings, new coating and wrapping machines, much larger parking areas, more roads for truck deliveries and enlarged office space.

The benefits you receive from SPI coated and wrapped pipe have resulted in more business for us.

standard pipeprotection inc.
3000 SOUTH BRENTWOOD BLVD. • ST. LOUIS 17, MISSOURI

Valve Museum. Unique valve museum, recounting the history of lubricated plug valve development, has been opened by Rockwell Manufacturing Company at its Barberton, Ohio, manufacturing plant. Displayed are drawings, cutaways, and working models showing progress in designs and types from Sven Nordstrom's original lubricated plug valve 40 years ago to today's highly developed models.

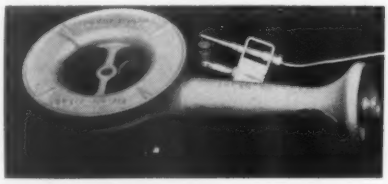
More Meters — Rockwell Manufacturing Company has acquired the assets of Republic Flow Meters Company of Chicago. Republic manufactures electronic and pneumatic instruments and process control equipment for the automatic measurement and control of flow for the electrical, petroleum, natural gas, steel and chemical industries. Manufacturing operations are centralized at Chicago, with sales offices or branches maintained throughout the country.

Sherman Products, Inc., in accelerating its expansion program for manufacturing and marketing facilities, has created a new Spartan Division. First product of the new division is to be a front-end loader designed to fit almost all types of medium sized tractors. Other products will soon be announced for marketing by distributors across the nation.

GAMA Adds Two—Dura-Vent Corporation and the Pate Company Inc., have been elected to membership in Gas Appliance Manufacturers Association. Dura-Vent of Redwood City, California, manufactures Type B and Type BW gas vent pipes. The Pate firm manufactures complete boiler-burner units.

Hills-McCanna Company of Chicago has appointed H. D. Hale & Company of St. Louis, Missouri, exclusive representative for Hills-McCanna Chemical Metering and Proportioning pumps and Force Feed lubricators in the states of Missouri and southern Illinois.

Consolidated Edison has set its sights this year on increasing its gas revenue by $4.755 million annually from new gas heating equipment installations in its 439 sq mile New York City and Westchester gas service area. This new gas revenue goal for 1957 exceeds last year's gains. New gas heating installations in 1956 represented additional annual revenue of $4,635,000 to the utility. Included in this total was $2,660,000 in space heating revenue representing 9899 space heating jobs worth $5,600,000 in new business to the local plumbing industry. Since Con Ed reduced gas rates for apartment house heating a year ago, 446 apartment houses have signed up for gas space heating, and gas space heating equipment was included in more than 80 percent of new homes built last year in the company's gas service area.



"Blue Halo" Burner — so named because of its large, circular, horizontal flame pattern — has enabled John Wood to reduce overall height of its gas water heaters up to 18½ inches in 20 gal. models, 8½ inches in 30 and 8 inches in 40 gal. models. Elimination of spillage and recirculation of gases made possible by the "Blue Halo" burner design has enabled John Wood to eliminate use of inner doors on combustion chambers of these heaters. This simplifies installation and servicing.

First annual competition to recognize outstanding public relations achievement in the gas industry has been established under the PAR Public Information Program of American Gas Association. All AGA member companies are eligible to compete for the new "AGA Public Relations Achievement Award." Handsome trophy will be presented annually to the winning activity that must have contributed to the development of better public opinion and understanding of the company, gas service or of the gas industry. Presentation will be made during the annual AGA convention.

To help celebrate its 100th anniversary this year Graver Tank and Mfg. Co., inc. is offering prizes for information as follows: (1) where is the oldest Graver tank still in use ($100); (2) who has the oldest picture of a Graver tank ($100) and (3) the best idea of decoration of a Graver tank or tanks — either in existence or planned — ($500, and two $250). Entries should be mailed to Centennial Committee, Graver Tank and Mfg. Co., inc., East Chicago, Indiana, before November 1, 1957.

Gas air conditioning of all Rockwell Manufacturing Company plants built in the past five years has more than paid for itself in terms of increased efficiency and reduced costs of operation. Advantages achieved through complete air control including, better quality of workmanship at lower cost, more qualified personnel attracted by better working conditions, reduction of absenteeism from colds, and inventory and equipment cost savings, resulted in the incorporation of gas air conditioning in Rockwell's new plants at Russellville, Kentucky; Kearney, Nebraska; Porterville, California, and new additions at Tupelo, Mississippi, and DuBois, Pennsylvania, Most of these plants employ the Carrier gas absorption system.

Kitchen Planner of the future, pert Pam Snyder, 5 (and a half), shows how she'd arrange appliances in her own home. Paying close attention is Harold Massey, managing director of the Gas Appliance Manufacturers Association which met recently to discuss "kitchen design for the next generation."

Peak Shavings

. . . . with laughing gas

Flattery is the art of telling the other fellow what he thinks of himself.

"The traps on this course are very annoying," observed a member of the golfing foursome.

The one who was putting raised his head.

"They certainly are," he commented. "Would you mind shutting yours?"

Most women's hats are different because milliners rarely make the same mistake twice.

Pilot Light Definition:
Bell Hole — an excavation for bells and belles.

A snobbish rich man drove up to the front of the hotel in a Ford Thunderbird. The colored doorman gave him a parking check for the car and got in it to drive it away.

"Do you know how to handle these high powered cars?" the snob snapped.

"Yass sir," the doorman grinned, "I sho do — it's just a little ole Fode."

Teacher: "And from the skunk, we get fur, isn't that right, Johnny?"

Johnny: "I'll say it is — as fur as possible."

Moscow radio says U.S.A.'s a hysterical, topsy-turvy country where people eat upside-down cake, doors go around in circles and everybody has an inside outhouse.

Bookie: A pickpocket who lets you use your own hands.

Pilot Light Definition:
Chart — a circular piece of paper which has been known to be very useful in round bird cages.

Do you know the definition of a redhead? — A communist outhouse.

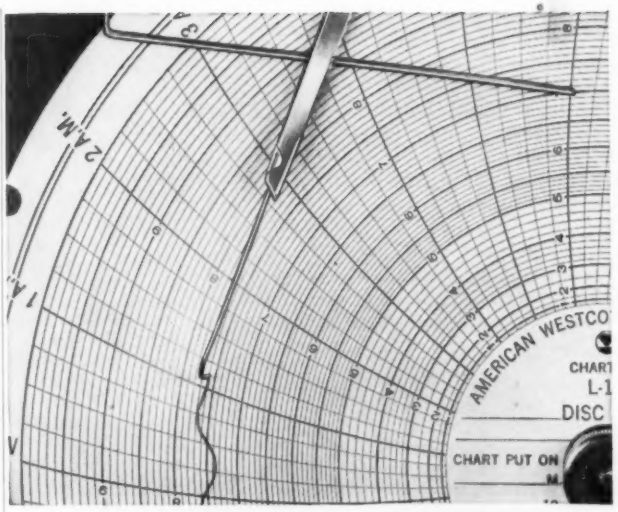
The woman who makes a match for her daughter usually intends to referee it as well.

Salesman: "And this model will go 120 mph, turn in a wink, and stop on a dime."
Customer: "Then what?"
Salesman: "A little putty knife comes out and scrapes you off the windshield."

A lot of us who complain about the boss being dumb would be out of a job if the boss were smarter.

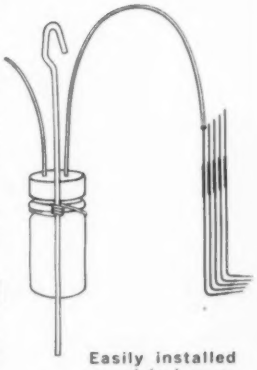
Pilot Light Definition:
Meter — a device that tells who got how much.

"I did *not* say you were built like a truck," the man insisted to his wife. "I merely said people are afraid to pass you on the right."



CANNON PENS

assure legible charts ...eliminate inking problems



Cannon controlled-flow capillary meter pens provide exceptional dependability and long life with minimum maintenance. Easy to install, these precision pens produce accurate chart records of maximum legibility and continuously record up to a full year without refilling reservoir.

Easily installed as original or replacement equipment in all standard recording instruments. Available in five sizes and angles — special pens upon request.

- **Ends Unrecorded Intervals.** Unaffected by pulsating flows, chart speeds, rapid pen movement.
- **Sealed Ink Supply.** Prevents clogging from atmospheric contamination.
- **Two-Way Ink Flow.** Stainless steel writing point is positioned above ink level in reservoir and ink flows in either direction by capillary action—eliminates smearing, blurring.
- **Special Pens.** Designed and produced to customer specifications where special inking problems make standard pens impractical.

Write today for information

AMERICAN METER COMPANY
INCORPORATED (ESTABLISHED 1836)

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle Tulsa • Wynnewood. IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Regina

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

Men At Work IN THE GAS UTILITY INDUSTRY

R. W. Ramsdell

W. G. Rogers

● **Robert W. Ramsdell** has been elected president and chief executive officer of The East Ohio Gas Company. **William G. Rogers,** who has been served as president since 1951, has been elected chairman of the board of directors. Rogers will continue to be active in the management of East Ohio's parent company, Consolidated Natural Gas Company, of which he is a member of the board of directors and the executive committee.

● **Vernon M. F. Tallman** has been elected to the board of directors of Springfield Gas Light Company, Springfield, Massachusetts. He has been associated with the company since 1920 as engineer, commercial and industrial manager, executive assistant, consulting engineer and vice president.

V. M. F. Tallman

H. A. Sharrett

● **Harry Allan Sharrett,** manager of publicity for Baltimore Gas and Electric Company since 1943, retired from active service on April 30, after completing thirty-three years of service with the company. Previous to managing the publicity department, he served as assistant to the executive vice president and for 16 years as assistant to the president.

● **Richard L. Brickley,** partner in law firm of Brickley, Sears & Cole, has been elected to the board of directors of Brockton Taunton Gas Company of Brockton, Massachusetts.

● **Paul J. Imse,** vice president and secretary, has been elected to the board of directors of Milwaukee Gas Light. He fills the vacancy created by the retirement of **Henry Fink,** president of Michigan-Wisconsin Pipe Line Company and American Louisiana Pipe Line Company.

● **William T. Jebb** has been elected president of The Hartford Gas Company. He was formerly vice president and general manager.

● **Eskil I. Bjork** has been elected chairman and chief executive officer of The Peoples Gas Light and Coke Company, effective June 1, after having been president since 1952. He will succeed **James F. Oates, Jr.,** who is leaving to become president and chief executive officer of the Equitable Life Assurance Society of the United States in New York. **Joseph J. Hedrick,** now president of Peoples' pipeline subsidiaries, Texas Illinois Natural Gas Pipeline Company and Natural Gas Pipeline Company of America, will succeed Bjork as president of the parent company. **Remick McDowell,** vice president in charge of finance and public relations, has been elected to the newly created position of executive vice president of Peoples Gas. Major changes for the subsidiaries includes: **George P. Garver,** formerly vice president and secretary-treasurer, will become president. **Mark V. Burlingame,** formerly vice president in charge of operations, will become executive vice president, a new position.

● **Paul Kayser,** president of El Paso Natural Gas, has been elected chairman of the board of directors of Pacific Northwest Pipeline Corporation and an officer and director of several other companies in which Pacific Northwest has interests. He succeeds **Ray C. Fish,** who continues as a director of the corporation. **Howard Boyd,** vice president and assistant general counsel of El Paso, has been elected vice chairman of the Pacific Northwest board, succeeding **C. R. Williams,** who remains a member of the board of directors. Election of Kayser and Boyd followed the resignations of **Robert R. Herring** and **Norman V. Kinsey** from board membership. **Stuart F. Silloway** continues as president of Pacific Northwest.

● **Anson L. Berryman,** president of Fall River Gas Company, retired on March 31 after 29 years of service. **Wesley P. Patnode** will succeed him as president of the Massachusetts company.

● Lone Star Gas Company has announced two personnel changes because of recent retirements. **Walter J. Roberge** has been named manager of the purchasing department succeeding **W. G. Nash** who retired recently. **A. L. Williams** has been named manager of the stores department following the retirement of **E. L. Harpold. Fred E. Bethurum** has been named as Williams' assistant.

● **Theodore A. Schlink** has been re-elected chairman of the board and **Earl D. Edwards** has been re-elected president of Central Illinois Light Company.

● **Willard L. Amann** has been appointed manager of industrial sales for Houston Natural Gas Company succeeding **John M. Robertson.** Amann moves up from his previous post of assistant to general sales manager.

● **John B. Tweedy** has been elected to the newly created office of assistant to the chairman of the board of directors of Southern Natural Gas Company of Birmingham, Alabama.

● **Watson F. Tait, Jr.,** has been elected executive vice president of Public Service Electric and Gas Company of Newark, New Jersey.

W. C. Bullock

J. C. Gilbert

E. B. Patterson

R. M. McIntyre

● **William C. Bullock,** Harbor division manager of Southern Counties Gas has been appointed to succeed retiring **J. C. Gilbert** as manager of the company's Santa Monica Bay division; and **Edward B. Patterson** has been appointed manager of the Harbor Division. **Robert M. McIntyre** will succeed Patterson as sales manager in the Orange County division.

● **R. E. "Dick" Evans** has been named manager of Pioneer Natural Gas Company's Slaton office. **Tom Furlow** has been appointed irrigation inspector and **H. R. King** was named to manage the Tulia office.

Edwin Dupies

Kendall Smith

● **Edwin (Pat) Dupies,** new building specialist in the North Shore Gas Company sales department, has been named Libertyville, Illinois, district manager. **Kendall Smith,** a former newsman at Radio Station WKRS in Waukegan, has been named new advertising manager for the company.

● **D. G. Sisterson** has been elected a director of Texas Gas Transmission Corporation. He is principal partner in the firm of D. G. Sisterson & Co., certified public accountants, Pittsburgh and New York.

Personals

T. P. Walker

E. C. McGraw

● **Tom P. Walker** has been named to the newly created position of chairman of the board of Transcontinental Gas Pipe Line Corporation and **E. Clyde McGraw** will succeed him as president and chief executive officer of the company.

● **William E. Ferguson,** vice president and manager of production, and **Frank S. Williams,** vice president in charge of distribution, have been elected directors of the Ohio Fuel Gas Company of Columbus.

● **Frank Wise** has been appointed to the staff of the American Gas Association as assistant to **Curtis Morris,** manager of the Washington office.

● North Shore Gas Company of Waukegan, Illinois, recently elected two vice presidents—**Oscar F. Rogers** as vice president in charge of operations and **Jerome P. Happ** as vice president in charge of sales.

Pilot Light Definition:

Street ell—a term used by Englishmen to describe American traffic.

● American Gas Association has announced the appointment of three men to positions in its headquarters office in New York City. **Samuel J. Cunningham** has been named research assistant to the Research Bureau. **Joseph F. Giaccone** joins the Bureau of Statistics staff after 10 years with the American Transit Association in New York. And, **W. Roger Sarno** has been added to the Utilization Bureau as assistant utilization engineer specializing in heating and air-conditioning.

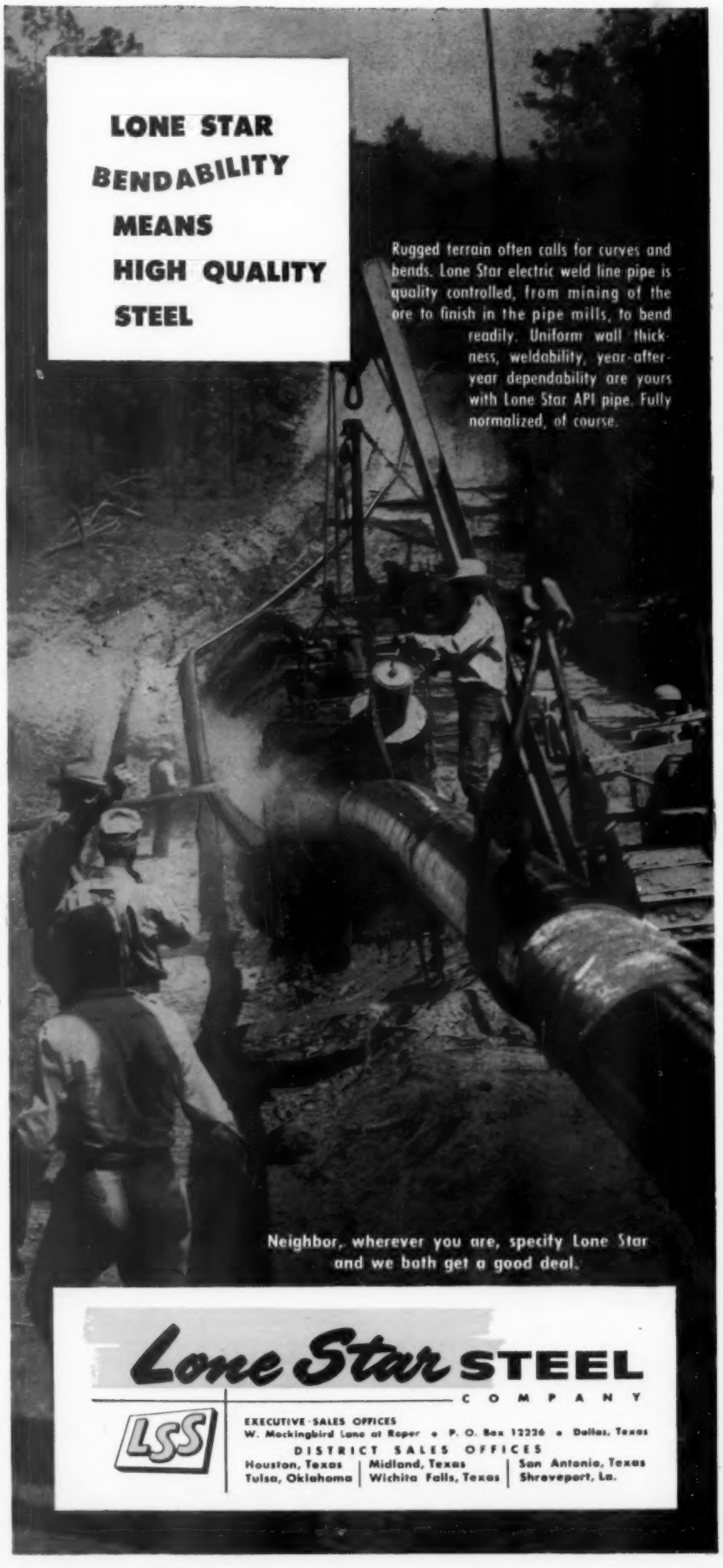
● **Joseph R. Rensch** has been appointed assistant counsel of Southern Counties Gas Company of California. Formerly Rensch, an engineer as well as an attorney, was superintendent, production control department of Dow Chemical Company.

John R. Leggate

John R. Leggate, manager of customer service of Equitable Gas Company, died suddenly in his home April 2. A 32-year veteran of Equitable, Leggate joined the company as a clerk in the retail service department.

Vernon F. Palmer

Vernon F. Palmer, vice president in charge of operations for the Union Gas System, died April 7 following a brief acute illness from heart complications. Palmer was a pioneer in the gas business in Southeast Kansas, having started with Union Gas in 1915.


LONE STAR
BENDABILITY
MEANS
HIGH QUALITY
STEEL
Rugged terrain often calls for curves and bends. Lone Star electric weld line pipe is quality controlled, from mining of the ore to finish in the pipe mills, to bend readily. Uniform wall thickness, weldability, year-after-year dependability are yours with Lone Star API pipe. Fully normalized, of course.
Neighbor, wherever you are, specify Lone Star and we both get a good deal.
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DISTRICT SALES OFFICES
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Tulsa, Oklahoma | Wichita Falls, Texas | Shreveport, La.

Personals

● Roots-Connersville Blower Division of Dresser Industries, Inc., has announced the following two promotions: **Glenn H. Crocker** has moved up to the position of manager, factory sales from chief application engineer, centrifugal equipment. And, **Joseph L. Hylton** has been promoted to the newly created post of manager, market research. Previously, he was assistant to the sales manager.

● **Francis Montelione,** assistant comptroller, The Brooklyn Union Gas Company, and **Gerard J. Kinlen,** treasurer, Inland Natural Gas Company, Ltd., have been elected to membership in the Controllers Institute of America.

● **William A. Boyd** has been appointed head of the general accounting department of New York State Natural Gas Corporation.

● **Mrs. Shirley Pemberton** has been placed in charge of the home economics department of Robertshaw-Fulton Controls Company.

● **Joseph C. Henderson,** supervisor of purchases for the John Wood Company, retired March 31 after 45 years' service with the company.

● **John D. Grayson,** former vice president and treasurer of American Tractor Corporation has been named controller of the J. I. Case Company.

● **Stan Osborne** has been appointed field representative for the Los Angeles Branch of General Controls Company.

● **Leon M. Fuquay,** secretary of the Federal Power Commission, has voluntarily retired from the commission.

● **Melvin M. Spero** has been appointed supervisor of the tabulating division of New York State Natural Gas Corporation's general accounting department.

M. M. Spero

L. O. Vogelsang

● **Lewis O. Vogelsang** has been elected president of the Rio Grande Valley Gas Company. A native Texan, Vogelsang is a graduate of the University of Texas with a Bachelors and Masters degree in engineering. He joined the gas company in 1946 as vice president and general manager.

● **Ray C. Fish** has been elected chairman of the board of The Fish Engineering Corporation, Houston, Texas. **C. B. Ames** has been named president of the engineering and construction firm.

C. B. Ames

B. S. Nelson

● **Bert S. Nelson** has been appointed director of engineering for the products division of Hills-McCanna Company.

● The Permaglas division of A. O. Smith Corporation has appointed **W. T. Halket** and **J. W. Burleson** to general sales manager positions. Halket will manage sales of water heaters and Burleson will be in charge of home heating and air conditioning equipment sales.

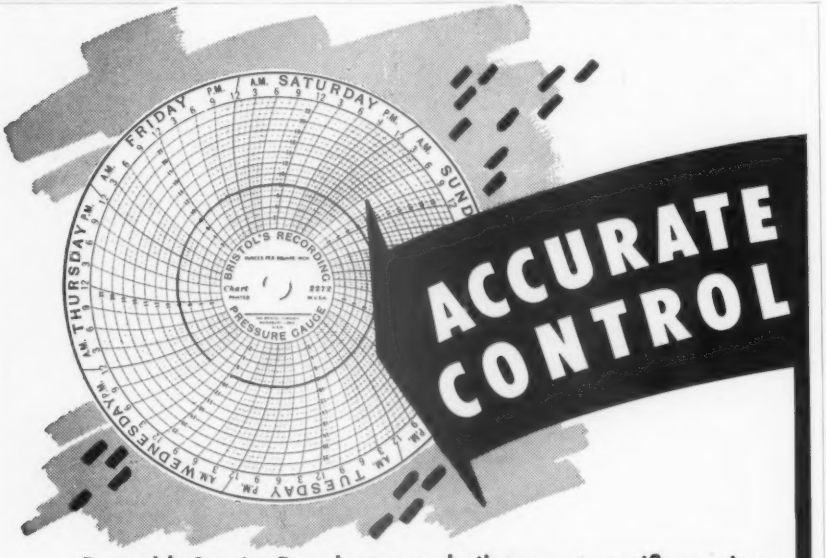
● **Frank E. Batson** has been appointed manager of quality control for the home appliance division of Servel, Inc. Batson succeeds **Edward J. Cassidy,** who was recently made manager of the company's defense division.

● **L. C. Vandertill** has been elected vice president and director of appliance division sales of Motor Wheel Corporation.

L. C. Vandertill

J. B. Cook, Jr.

● **James B. Cook, Jr.,** has been appointed sales manager of the Hays Manufacturing Company general products division of Erie, Pennylsvania.



Reynolds Service Regulators are built to meet specific requirements — years of operation in the field through a complete range of operating conditions have proved not only their superiority but their durability. With parts so precisely machined for each model that they are completely interchangeable. The accuracy you require in performance is assured.

MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For horizontal or vertical connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal or diaphragm operated relief valve.

Reynolds Gas Regulator Co.

ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

COMING EVENTS *IN THE GAS UTILITY INDUSTRY*

June

2- 5 American Gear Manufacturers Association, annual meeting, The Homestead, Hot Springs, Virginia.

2- 5 The American Society of Refrigerating Engineers, Hotel Fontainebleau, Miami Beach, Florida.

3 Gas Technology Short Course, North Carolina State College, Raleigh, North Carolina.

3- 5 American Management Association, general management conference, Statler Hotel, New York.

3- 5 Institute of Appliance Manufacturers, Netherland-Hilton Hotel, Cincinnati, Ohio.

4- 6 Appalachian Underground Short Course, West Virginia University, Morgantown, West Virginia.

5- 7 National Warm Air Heating and Air Conditioning Association, The Warm Air Heating Institute of Northern California, The Institute of Heating and Air Conditioning Industries, and Portland Warm Air Heating and Air Conditioning Association, summer convention, Hotel Fairmont, San Francisco, California.

9-13 ASME, semi-annual meeting, Sheraton-Palace Hotel, San Francisco, California.

12-14 NEGA gas measurement school, Worcester Polytechnic Institute, Worcester, Massachusetts.

14 Public Utilities accident prevention conference, Daniel Boone Hotel, Charleston, West Virginia.

16-21 American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

19 NEGA street department supervisors group, Hotel Bancroft, Worcester, Massachusetts.

19-21 National Committee for Utilities Radio, annual meeting, Benjamin Franklin Hotel, Seattle, Washington.

23-25 Wisconsin Utilities Association, accounting section convention, King's Gateway Hotel, Land O'Lakes, Wisconsin.

24-25 Michigan Gas Association, Grand Hotel, Mackinac Island, Michigan.

24-27 Canadian Gas Association, Jasper Park Lodge, Jasper, Alberta, Canada.

24-27 American Society of Heating and Air Conditioning Engineers, semi-annual meeting, Murray Bay, Quebec, Canada.

25-28 American Home Economics Association, St. Louis, Missouri. (AGA will exhibit.)

July

8 Gas Technology Short Course, North Carolina State College, Raleigh, North Carolina.

8-12 National Housewares & Home Appliance Manufacturers Exhibits, Atlantic City, New Jersey.

22-26 Western summer radio-television and appliance market, Western Merchandise Mart, San Francisco, California.

28-August 9 Sixth Utility Management Workshop, Columbia University, Arden House, Harriman, New York.

August

26-28 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, West Virginia.

September

3- 5 Pacific Coast Gas Association Convention, San Francisco, California.

4- 5 AGA operating section organization meeting, Sherman Hotel, Chicago.

6 New Jersey Gas Association, annual meeting, Spring Lake, New Jersey.

9-13 AGA Industrial Gas School, Hotel William Penn, Pittsburgh, Pennsylvania.

10-12 Mid-West Gas Association, gas school and conference, Iowa State College, Ames, Iowa.

11-13 National Petroleum Association, annual meeting, Traymore Hotel, Atlantic City, New Jersey.

11-15 National Hotel Exposition, Coliseum, New York, (AGA will exhibit.)

12 NEGA safety conference, Hotel Statler, Boston, Massachusetts.

13-14 Maryland Utilities Association, 33rd annual fall conference, The Cavalier Hotel, Virginia Beach, Virginia.

16-18 AGA 9th annual accident prevention conference, St. Louis, Missouri.

18-20 Southeastern Gas Association convention, Robert E. Lee Hotel, Winston Salem, North Carolina.

18-20 American Society of Association Executives, annual meeting, Chase-Park Plaza Hotels, St. Louis, Missouri.

20-21 Public Utilities Association of the Virginias, annual meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

22-25 ASME petroleum mechanical engineering conference, Mayo Hotel, Tulsa, Oklahoma.

23-25 ASME, fall meeting, Statler Hotel, Hartford, Connecticut.

23-26 American Transit Association, Sheraton-Mt. Royal Hotel, Montreal, Quebec, Canada.

October

1- 4 NACE, south central regional meeting, Municipal Auditorium, Oklahoma City, Oklahoma.

7- 9 AGA annual convention, Kiel Auditorium, St. Louis, Missouri.

10-12 ASME Fuels-AIME conference, Chateau Frontenac, Quebec, Canada.

14-17 The Wire Association, annual convention, LaSalle Hotel, Chicago, Illinois.

16-18 Wisconsin Utilities Association, annual convention, Schroeder Hotel, Milwaukee, Wisconsin.

21-25 National Safety Council, Conrad Hilton Hotel, Chicago, Illinois.

22-25 The American Dietetic Association, Miami, Florida.

23 NEGA street department supervisors group, Hotel Bancroft, Worcester, Massachusetts.

23-24 Computer Applications Symposium, sponsored by Armour Research Foundation, Hotel Sherman, Chicago, Illinois.

27-30 American Gear Manufacturers Association, semi-annual meeting, Edgewater Beach Hotel, Chicago, Illinois.

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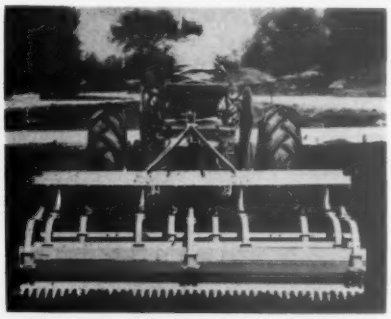
NEW EQUIPMENT
FOR THE GAS UTILITY INDUSTRY

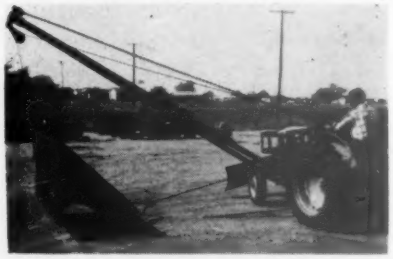
For more information on items described here in brief, use the handy reply card and circle the corresponding numbers



Scarifier and Rake. Roseman Tractor Equipment Company has announced a new landscape scarifier and rake attachment for wheel type tractors that can be used in backfill clean-up where utility gas mains cross parks and other landscaped areas. Model TRIP-11 Tiller Rake is equipped with choice of 2 point fast hitch or 3 point hook-ups. Smaller models for use in narrow and confined areas are also available. *Roseman Tractor Equipment Company.*

CIRCLE (12) ON THE REPLY CARD

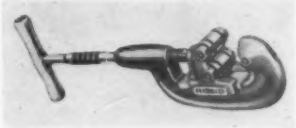
Sooner Boomer. Crutcher-Rolfs-Cummings, Inc., has been authorized as exclusive pipeline distributor for the new Sooner Boomer. Built in Oklahoma City



by Pneumatic Pipelayers, Inc., the Sooner Boomer is a Ford Tractor mounted with a side-boom and counter-weight. Other equipment includes 7-ft dozer blade, backfiller board with chain, rear-end winch, optional 8-speed transmission, up to 8-in. bending shoes, and large pneumatic tires. Sooner Boomer is capable of 26 mph road speeds. All operation is hydraulic, with power up and down on boom cables. Still another feature is power steering. *Crutcher-Rolfs-Cummings, Inc.*

CIRCLE (13) ON THE REPLY CARD

Wide-Roll Pipe Cutter. A new Ridgid Tool, No. 202 Wide-Roll Cutter designed for easier better pipe cutting with



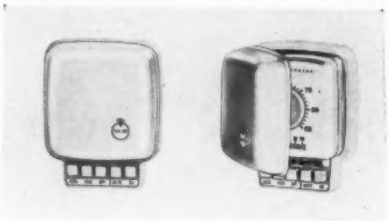
a power drive, is now available for heavy duty use. Extra wide roll built into the 202 cutter has double the bearing surface on the pipe. This new wide-roll sets and holds revolving pipe at a perfect right angle assuring clean starts for perfect tracking and straight cuts. *The Ridge Tool Company.*

CIRCLE (14) ON THE REPLY CARD

Self-Propelled Blast Hole Drill. New knee-action crawler drill known as "Crawl-IR" has been introduced by Ingersoll-Rand. Completely mechanized, unit will have wide application in utility and general construction work, wherever rock must be drilled for blasting. New machine is mounted on crawler tracks driven by air motors. All boom and feed-tower adjustments are hydraulically controlled for faster, safer positioning of the drill. *Ingersoll-Rand Company.*

CIRCLE (15) ON THE REPLY CARD

Push-Button Thermostat. White-Rodgers has announced marketing plans and immediate availability of new *Fashion*-styled PushButton Heating-Cooling Thermostat—believed to be first push-



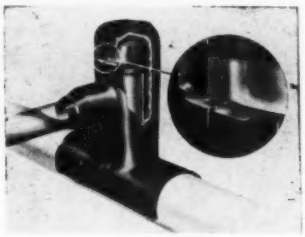
button room thermostat in history of the temperature control industry. Unit is a combination of new push-button sub-base and White-Rodgers Fashion Thermostat. Available in combinations to fit most heating-cooling systems, new control offers from two to five push-buttons. Contoured square hinged cover conceals dial settings, thermometer and easy-to-read dial with a large knob indicator for quick adjustment. Thermostat is simple to install; wires are easily connected to clearly marked terminals and dial face with hinged cover are quickly snapped into place. *White-Rodgers Company.*

CIRCLE (16) ON THE REPLY CARD

Low Cost Trencher. New lost cost service line trencher for contractors, utility companies, and municipalities has been announced by The Charles Machine Works Inc. Completely mobile, the new Model M Ditch-Witch trencher has 3 forward digging speeds and reverse. In usual digging conditions, the unit will trench at speeds of 1½ to 6 ft per min. Trenching widths and depths available are 3 in. wide up to 48 in. deep, 4 in. wide up to 36 in. deep, and 6 in. wide up to 30 in. deep. Unit is powered by 8 hp air cooled engine, and weighs 500 lb. *The Charles Machine Works, Inc.*

CIRCLE (17) ON THE REPLY CARD

Plastic Service Tee. Low priced plastic cover that provides complete and permanent corrosion protection for service tees has been announced by Modern Utility Supply Company. By using plastic tape



and the tee cover, uncoated portion of main and service pipe can be covered less expensively than by any other serviceable type of coating. Cover is made of flexible vinyl plastic in two halves with a wedge designed tongue and groove for joining. Solvent cement is brushed on the tongue and groove and then the halves placed around the tee and joined. Wide tape is placed on bottom of the main, brought up over the saddle sides of the cover, and spirally wrapped over each end of the saddle. Unit will accommodate standard steel service tees welded on gas mains of 2 to 6-in. *Modern Utility Supply Co.*

CIRCLE (18) ON THE REPLY CARD

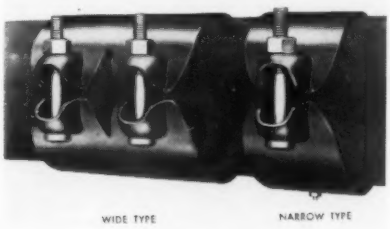
Oil-To-Gas Conversion Unit. Banner Burner Company has developed a conversion unit, OG-56, that features ease of installation (unit fits through 4-in. oil burner sleeve); one piece cast iron construction of venturi and flame spreader, and quality components such as Minneapolis-Honeywell controls. Inputs range from 60,000 to 150,000 Btu input. Unit has been tested and certified by AGA. *Banner Burner Company.*

CIRCLE (19) ON THE REPLY CARD

Service Utility Truck. Distinctive styling, high-efficiency truck engine, greater driver comfort, and maneuverability are features of new International light-duty truck with service-utility body. Rated at 4200-5400 lb gross vehicle weight, unit (Model A-110) is powered by a 141-hp International Black Diamond engine. Models are available from 4200 to 33,000 lb gvw, in four, six-wheel and all-wheel-drive conventional and new cab-forward design. A choice of five gasoline and four LPG-fueled engines is available. New 65-in. wide cab has widest inside dimension of any comparable truck model. *International Harvester Company.*

CIRCLE (20) ON THE REPLY CARD

Steel Economy Clamp. Skinner-SEAL has announced a radical improvement in design, together with a new manufacturing process for the Pressed Steel Economy Clamp. Used for repairing rust holes



WIDE TYPE NARROW TYPE

and corrosion spots in pipelines, this clamp is now cold formed on 500 ton press. Unit has new heavily reinforced, "closed" lug construction. Lugs are not welded to the clamp but formed from the material itself. Width of both clamps has been increased. Sizes range from 4 to 24-in. O.D. *M. B. Skinner Company.*

CIRCLE (21) ON THE REPLY CARD

Threadless Pipe Fittings that will withstand traction forces up to 3600 lb and hydro-static pressures ranging from 450 psi on 2-in. pipe to 5000 psi on ½-in. pipe have been developed by Telsco Fittings Division. Factory assembled, fittings are used in joining steel, wrought iron, or plastic pipe. No threading, grooving, flaring, soldering, or welding is necessary. A specially designed brass clutch ring with internal serrations grip the pipe wall as the fitting nut is tightened. Simultaneously, a neoprene gasket is compressed against the pipe wall, giving a permanent seal against leakage of gas or liquid, as well as resistance to abnormal vibration, contraction, or expansion. *Telsco Fittings Division.*

CIRCLE (22) ON THE REPLY CARD

Urban Area Ditching Problems? Twin castor wheel assembly for Barber-Greene Model 702 Ditcher, now offered as optional equipment on all machines of this type, was developed originally for customers having special problems of service ditching in cramped, urban areas. While normally the single centrally located castor is adequate for virtually every appli-

cation, in some types of urban service work, the twin castor assembly — two wheels mounted 24 in. apart—has the advantage. Twin wheels can readily "straddle" the broken area resulting from the practice of breaking pavement ahead of the ditcher when laying service lines across paved streets. And with the twin castor wheel assembly, faster digging and more accurate control of grade and direction result. Installation of the twin castors on any Model 702 now in the field is only a matter of four hours' labor. *Barber-Greene Company.*

CIRCLE (23) ON THE REPLY CARD

digs more trenches in more places at less cost—and

fits more jobs!

THIS CLEVELAND 92—a compact maneuverable "Baby Digger"—is doing a neat job of digging from driveway to driveway in a tree lawn that's really *narrow.* The operator sets in and lifts out the digging wheel with speed and safety because the 92 gives him full job visibility and fast accurate boom hoist control. Synchronized wheel and conveyor speeds permit precision placement of spoil. No damage to curb, sidewalk or driveways either, thanks to the 92's perfect balance on long, smooth, non-clog crawlers —a real public relations asset.

The Cleveland 92 "Baby Digger"

- Digs all soils
- Digs to 8′ deep
- Digs in any weather
- Power-shift conveyor
- Only 54″ wide over crawlers
- Reversible discharge
- Digs 10″ to 20″ wide
- Portable, at legal limit speeds

THE CLEVELAND TRENCHER CO.

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Good Everywhere

Things to write for . . .

Bulletins, brochures, books of interest to gas utility industry people

Arc Welding Handbook. Completely revised eleventh edition of Procedure Handbook of Arc Welding Design and Practice has been announced by Lincoln Electric. Major portion of this well-known reference has been completely rewritten. All sections have been closely reviewed and brought up-to-date. Contents of the 1300-page reference range from early history of arc welding to intricacies of structural design. Divided by subject matter, the book has eight sections—history, nomenclature and processes, weldability, mild steel procedures, manufacturing cost data, machine design, structural design, applications and reference data. *The Lincoln Electric Company.*

CIRCLE (49) ON THE REPLY CARD

Year-Round Air Conditioning Sales Manual. New sales presentation manual has been designed by Day & Night Manufacturing Company for use by heating and air conditioning dealers. Manual outlines sales story for potential year-round air conditioning buyers. Bound in handsome padded leather three ring binder, the manual is designed primarily for "personalization" by each dealer with space provided for shop photographs, job layouts, snapshots of past installations, etc. *Day & Night Manufacturing Company.*

CIRCLE (50) ON THE REPLY CARD

Zinc As Galvanic Anode. Reference manuals describing use and application of zinc as a galvanic anode to protect iron and steel from corrosion have been published by the American Zinc Institute, Inc. New publications represent latest results of a six-year investigation conducted by an independent research firm. *American Zinc Institute, Inc.*

CIRCLE (51) ON THE REPLY CARD

Plastic Valves and Pipe Fittings. New 16-page illustrated bulletin describing Walworth polyvinyl chloride (PVC) valves and fittings has been issued by Walworth Company. PVC valves and fittings are resistant to most salts, alkalis, and acids, and are designed for piping systems where corrosive fluids are a problem. Bulletin includes four pages of application tables on performance of normal and high impact PVC valves and fittings for handling about 315 different corrosive fluids. *Walworth Company.*

CIRCLE (52) ON THE REPLY CARD

Revenue Thru Rentals. How utilities can increase their revenue quickly through commercial rental of automatic gas water heaters is described in two brochures available from Ruud Manufacturing Company. Experiences of Citizens Gas & Coke Utility, Indianapolis, in conducting large-scale rental plan for commercial gas water heaters is discussed. In 18-months company rented 252 units, as compared with only 27 commercial gas water heaters sold in previous 12 months. "The Indianapolis Story," describes mechanics of rental plan and "The Story Behind the Indianapolis Story," is an outline by Ruud of how other utilities can use this rental plan. *Ruud Manufacturing Company.*

CIRCLE (53) ON THE REPLY CARD

Better Baking Research. Effects of variations in oven design features and load on temperature conditions and the resulting heat distribution in gas ovens is described in recent report published by American Gas Association Laboratories. Report No. 1264, "Performance Characteristics of Gas Ovens," presents additional information developed as part of PAR Plan Research Project DGR-11-C "Comparative Study of Various Methods of Cooking." Report extends information presented in two previously published reports, No. 1176, "Comparative Study of Various Methods of Cooking, Part I—Review and Analysis of Available Information," and No. 1182, "Comparative Study of Various Methods of Cooking, Part II—Heat Application to Gas Oven Cookery." Comprehensive discussion on both direct and indirect ovens is given in Report 1264 on effect of lowering height of oven flue opening, size of flue outlet area, free area of secondary air openings, position of oven burner, and relocation and shielding of thermostat bulb. *American Gas Association Laboratories.*

CIRCLE (54) ON THE REPLY CARD

1897 1956

GOODMAN USED SINCE 1897 — 2" HANDLE & LOCKING SLEEVE — GAS MAIN STOPPER

PIPE STOPPERS OF ALL KINDS

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SAFETY GAS MAIN STOPPER CO. INC.

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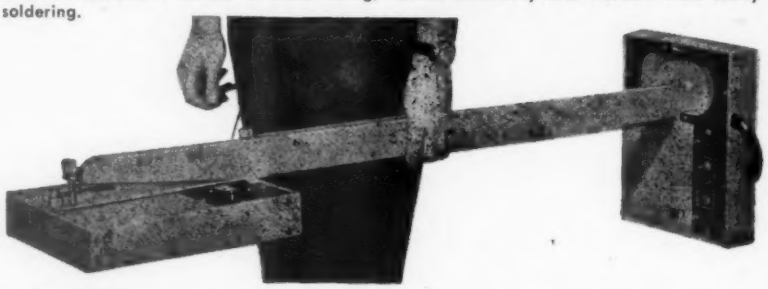
Cable Address: GASTOPPER, N. Y.

The WILKINSON LINE LOCATOR

PREVENTS COSTLY DAMAGE

Spots all sub surface pipes, cables, etc., and determines their depth accurately.

ETCHED CIRCUITRY: instead of hand wiring, insures uniformity and freedom from faulty soldering.



BATTERY TESTER: instantly indicates battery condition without removing batteries.

INSTRUMENT CASE: Made of tough, wear resisting phenolic material. The antennas are an integral part of cases, moisture and shock proof.

WILKINSON PRODUCTS COMPANY

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Industrial Radio Systems Registry. Communication Engineering Book Company has announced availability of the 1957 official Registry of Transportation Systems, that is revised annually from FCC records in Washington. Part 1 lists all systems in taxi, railroad, auto emergency, city bus, citizens service, urban transit, motor carrier, and highway truck services showing name and address of each licensee, location of each fixed transmitter, call letters, number of mobile units authorized, operating frequencies, and equipment manufacturer. Part 2 (added this year for first time) lists licensees according to transmitting frequencies employed. New editions contains 76 pages, nearly twice as many pages as in previous edition. *Communication Engineering Book Company.*

CIRCLE (55) ON THE REPLY CARD

Telemetering Remote-Control System. Newest application of electronics to "push-button" operation of complex industrial processes going on hundreds of miles away is Bendix Aviation's "Electro-Span." Applicable to almost any situation where it is desirable to separate a human supervisor from the device or installation he is supervising, "Electro-Span" eliminates need for "castaway" maintenance men in isolated areas. System spots change of temperature, liquid level, or pressure. Although all functions may be observed and operated locally, several stations may be remotely controlled from a central point. The system can operate over existing communications facilities. Unit operates on digital computing system measuring or sensing in terms of numbers. *Bendix Aviation Corporation.*

CIRCLE (56) ON THE REPLY CARD

Protective Coatings Catalog. New free 25-page, two-color Polyken Protective Coatings Catalog gives full information on coatings manufactured by The Kendall Company. Completely illustrated, the catalog describes the nature of corrosion and its control, and lists advantages of wrapping with Polyken polyethlylene tape together with diagrams, drawings, and descriptive copy. Tape method of application to pipe, preparation of surfaces, how they are coated and inspected are fully explained. *The Kendall Company.*

CIRCLE (57) ON THE REPLY CARD

Honeymoon: Period between "I do" and "You'd better."

New Literature

Kodak Industrial Handbook. With the completion of a new publication, "How-To-Do-It Pictures," the Kodak Industrial Handbook has been completely revised and is ready for distribution in its new format. Handbook also contains three other booklets: "Photographic Production of Slides and Filmstrips," "How to Organize and Operate Photographic Service Departments," and "Making Service Pictures for Industry." Complete handbook is designed to assist industrial photographer with problems of procedures, materials, and techniques. *Eastman Kodak Company.*

CIRCLE (58) ON THE REPLY CARD

WORLD WIDE SERVICES:

Detection and location through radiation.
Oil, Gas, Water, Minerals.
Exclusive Agent for German Strahlen "Cymoscope".
Geochemical Soil Analysis
Air-Ground Surveys — Interpretation.
Geodynamic Petroleum Prospecting.

Of Special Interest to All Oil Prospectors:
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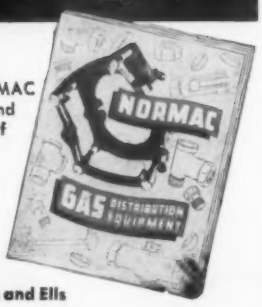
Couplings, Sleeves and Fittings . . .

- Save Time
- Handle Easily
- Give Dependable Service

Because They Offer . . .

- Maximum Deflection
- Ease of "Stabbing"
- Complete Confinement of Rubber



Today, write for your free copy of this NORMAC catalog . . . complete with illustrations and specifications on the entire Normac Line of Couplings, Sleeves and Fittings. It's a profitable step in the cost-cutting direction.

NORTON-McMURRAY MFG. CO.
122 South Michigan Ave., Chicago 3

Couplings • Meter Bars • Sleeves
Cocks • Bell Joint Clamps • Service Tees and Ells

SAVES $ LOTS OF $

$ . . . on pipe runs under streets, highways, pavement, gardens, etc.

REG. U. S. PAT. OFF.

HYDRAUGER*

HY-25C

OPEN HOLE

AVOID TIME WASTE

Hydrauger is a modern, time-saving way to install underground pipe . . . avoids trenching, backfilling, pavement cutting, etc.

2" to 24" BITS and REAMERS

HYDRAUGER CORP. Ltd.
681 Market Street
San Francisco, California

**Earth Boring Tool*

ASK FOR BOOKLET . . . NO OBLIGATION

FAST, LOW-COST WAY TO INSTALL PIPE . . .

push it under streets, roads, tracks, lawns with a timesaving

GREENLEE HYDRAULIC PUSHER

Speed underground piping jobs this way. GREENLEE Pusher is one-man-operated (by hand or with power pump), portable, simple to set up and use. No tearing up of pavement, floors, lawns . . . does away with extensive ditching, tunneling, backfilling, repaving. GREENLEE Pusher cuts job time to a fraction . . . often pays for itself on first job.

Two feet per minute average pushing time

GREENLEE Pushers are available in two sizes: No. 790 for ¾" to 4" pipe . . . No. 795 for pipe over 4", concrete sewer pipe, large ducts. Average performance of No. 790, shown above with power pump, two feet per minute. Write for literature.

GREENLEE

GREENLEE TOOL CO.

2426 Columbia Avenue • Rockford, Illinois

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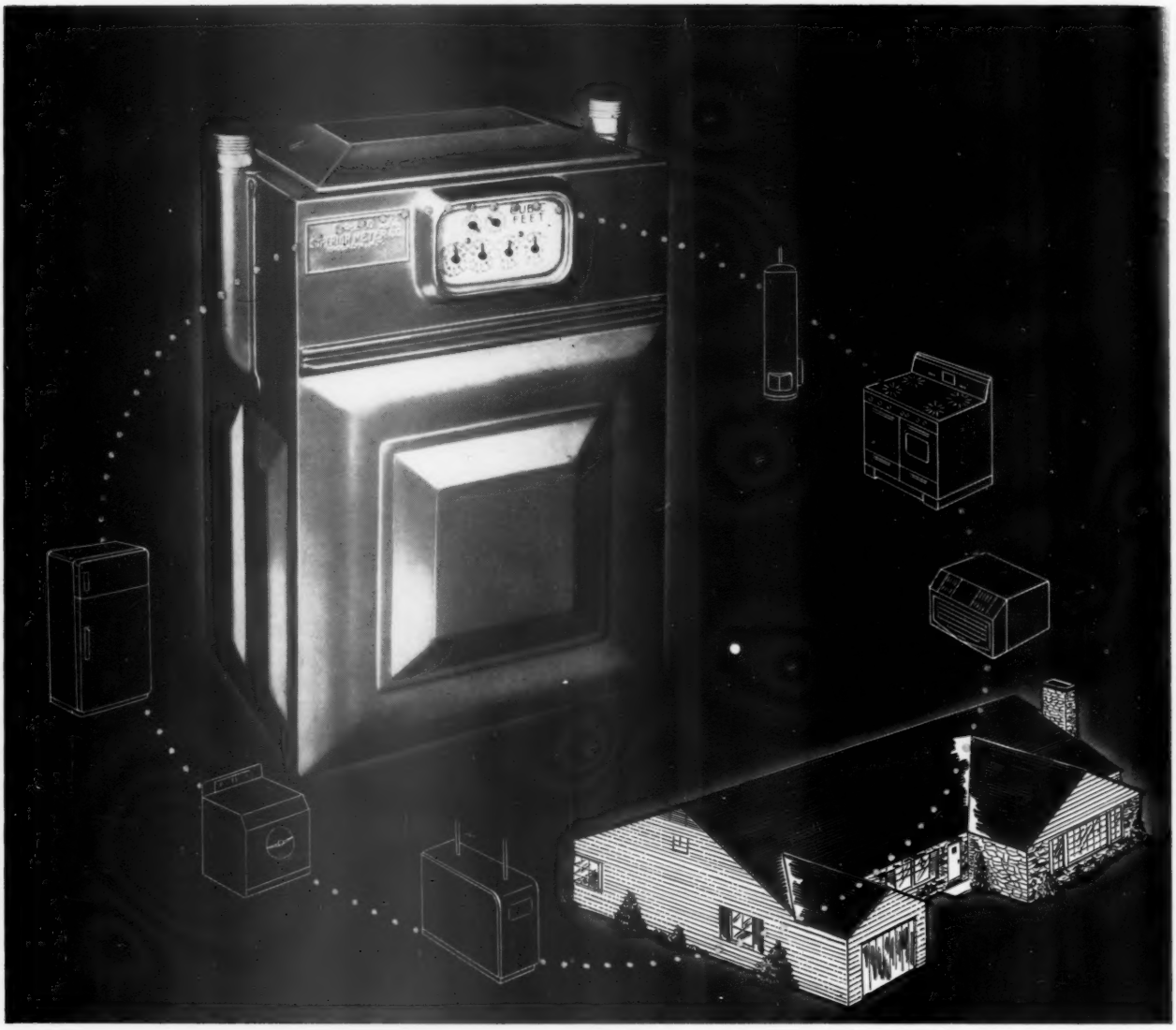

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HOW BELL SYSTEM COMMUNICATIONS SERVE THE PIPELINE INDUSTRY

CARROLL V. KROEGER, *distribution engineer, Washington Natural Gas Company, Seattle, Wash.*

"How we know when to interrupt our interruptibles"

Remote metering lines give Washington Natural Gas a 24-hour headstart on determining contract demand

"To stay on the profitable side of our contract, we need continuous readings of flow to determine customer demand—the difference between flow measured at city gates, and supply to our interruptibles," says C. V. Kroeger, Washington Natural Gas.

"Bell System remote metering lines give us these readings. Here in our Seattle office, meter readings from 75 remote points enable us to calculate flow at all gates and project demand over the next 24 hours. Thus we know when to interrupt our interruptibles —or tap our 'peak shaving' reserve.

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A Bell System representative will gladly study your communication needs—at no cost, of course—to show how you can get these benefits. Just call your local Bell Telephone Company business office.

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AMERICAN Gas Journal

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GAS TECHNOLOGY — OPERATIONS — EQUIPMENT — MANAGEMENT — UTILIZATION

VOLUME 184 — July, 1957 — Number 7

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Printed in U.S.A.

In this Issue

Man From Mars? Not hardly . . . even though he's just returning from a "space" adventure — the limited space available to a man working inside a 30-in. cast iron main, sealing joints with epoxy resin and glass fiber tape . . . a revolutionary new method of stopping leaky joints, as related in a special section in this issue on "Plastics for Main Repairs." The "Man From Mars" method was used in New Orleans; equally exciting new developments have taken place in Chicago and Milwaukee . . . **Also in this issue** you'll find informative reading on safety in utility LP-Gas plants, how to keep your warning lanterns sparkling, how corrosion affects water heaters, controlling gas load through telemetering, and another chapter in the American Gas Fundamentals series.

Newest "Salesman"to join their "staff," Bing Crosby will help the nation's gas utilities sell appliances during the 1957 Christmas season. Pictured here are "Der Bingle" and S. F. Wickstrom of AGA putting the finishing touches to a contract for Crosby's services in the forthcoming "White Christmas" campaign.

A real "first" for the gas utilities, the program will use all media — such as radio and TV spots, billboards, national advertising, displays, local advertising and art elements for tie-in advertising, and will feature Crosby's new home with its two all-gas kitchens. Theme of the program ties together the melodic carol, "White Christmas," with the idea of giving a modern gas appliance.

As result of the promotion, AGA expects its greatest sale ever of AGA promotional materials for local use . . . one company, Southern California Gas Company, already has planned for 1500 displays and 500 billboards and will merchandise Crosby's home locally. The $250,000 home features 14 tons of gas air conditioning, two all gas kitchens.

Mcf PICTORIAL

Down the Drain. Scenes like this were re-enacted over the Southwest and Midwest in recent weeks as torrential rains flooded vast areas. In Paris, Texas, (below) a sewer line broke and caved in, washing away enough soil to create a hole 10 feet across and eight feet deep. Lone Star Gas Company and Paris city employees, surveying the damage, noted that the gas main — the pipe at the right — was not damaged.

Mcf

Ninety-nine years. *Pardon us while we do a bit of boasting,* but with this issue, our favorite publication embarks on its 99th year of service to the gas utility industry. It's really quite an occasion — calling attention to the fact that AMERICAN GAS JOURNAL is one of the oldest business publications in America. The gas industry was still "new" when the founders of *American Gas Light Journal* put their first issue to press. In the subsequent years, both have survived wars, economic ups and downs, and experienced many changes. Today's gas utility industry reflects many changes in technology and salesmanship . . . and today's AMERICAN GAS JOURNAL keeps pace with these continuing changes . . . faithfully chronicling the industry's events, informing its readers of the changing engineering and operating technology, and recording for posterity our industry's dynamic growth.

Northern Utah cities will receive natural gas service if approval is granted by the Utah PSC on a plan filed by Mountain Fuel Supply Company. A projected $3,500,000 transmission and distribution system would be built to serve the last major population area in northern Utah, including Logan and Brigham City in 1957 and other communities in 1958. New distribution systems would have to be built in both cities, as neither has had any type of gas service through mains before.

Hydronics. Mark that word in your dictionary. It's not there now, but it may be soon, if a proposal by the Institute of Boiler and Radiator Manufacturers is adopted by the industry. "Hydronics" is proposed as the term to be used in describing the "science of heating and cooling with water." The term was offered after extensive consultation with engineers, manufacturers, and even language specialists.

Utility Relocation Bills. Rhode Island's Governor Roberts has vetoed a legislative bill that would have required reimbursement to utilities for costs of moving their facilities when required by federal-aid highway projects. In Oklahoma, the state attorney general's office has ruled that a similar bill, allowing use of 90-10 federal matching funds could be used for public utility facility relocation along the interstate highway system.

Profitless prosperity may be the theme for 1957 in the home appliance business despite a volume expected to equal or exceed last year, says Judson S. Sayre, president of Norge Division, Borg-Warner Corporation. He pointed to over-production and price cutting as the reasons for decreased profit margins, unbalanced inventories, and giveaway prices.

Western Washington will have the Northwest's largest population area served by an integrated natural gas distribution system, made possible by a new industrial sales contract. The utility will deliver 7-million cu ft per day to American Smelting and Refining Company in Tacoma, and to do so, must be able to shift gas from one part of its system to another as demand indicates. To accomplish this, the company will build 11 miles of pipeline to interconnect its northern and southern division territories and build 4½ miles of supply line.

Houston Natural Gas Corporation continues to grow. Latest acquisition of the Texas Gulf Coast gas company is the oil and gas properties formerly owned by McCarthy Oil and Gas Corporation, at a cost of approximately $7,000,000. Purchase was made from the Equitable Life Assurance Society of the United States, which held the properties. Included is Equitable's net interest of some 17,000 acres, of which 10,000 are producing. All are within 100 miles of Houston. The properties will be owned and operated by Houston Natural Gas Production Company, Houston Natural's production subsidiary.

For the second time in two years, the Arkansas PSC has approved a $4,300,000 rate increase for Arkansas Louisiana Gas Company that applies to 34 large industrial customers of the company. The rate increase has been collected under bond for two years. On the first go-'round, the PSC granted the increase of a fair field price theory and allowed the utility to collect 8 percent return on its investment. Arkansas' Supreme Court objected and sent the case back to the PSC. Following the court's orders, the PSC still came up with the $4,300,000 increase. The state PSC noted that the increase to large industrial users from 14.2 cents to 17.9 cents per MCF is "fair and equitable" and called it "one of the lowest comparable industrial rates" called to the commission's attention.

Taxes took a big hunk out of utility revenues in 1956, reports the AGA. In fact, taxes were 31 percent greater than net income available for distribution to stockholders and for expansion to meet consumer requirements. Taxes for 1956 reached $780,000,000, nearly 13 percent above the previous year, while net income was $597,000,000, compared to $524,000,000 in 1955.

Bomb scares being as common as they are these days, it came as no surprise to Oregon State Police when someone phoned their Beaverton headquarters to report a strange looking tube about five feet long with a wire attached. The State Police, more familiar with bombs, discovered that the mysterious tube was an anode belonging to Portland Gas & Coke Company. "Anode, it was no bomb," the officer punned, as he turned it over to the company's Hillsboro office.

Continuing to build and diversify its market, The Consumers' Gas Company of Toronto has acquired the physical properties of Interprovincial Utilities, Ltd., which supplies manufactured gas service. The new move follows a two-year general expansion program in anticipation of the arrival of Alberta natural gas in eastern Canada. Consumers', in 1956, also purchased Shore Gas Company's distribution system and the Provincial Gas Company as part of a plan to achieve proper balance of natural gas load in industrial, commercial, and residential markets.

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Drills ¼" through 1"
Pressures to 500 p.s.i. at 100° F.
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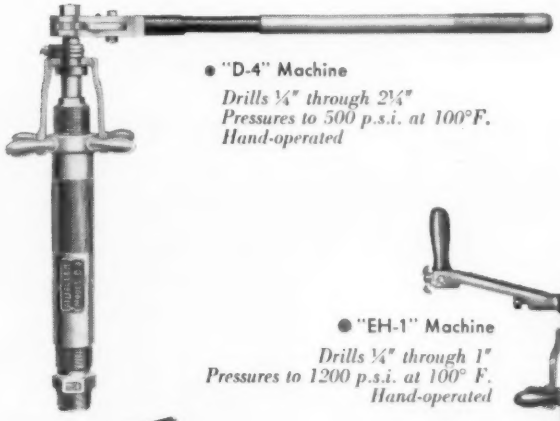
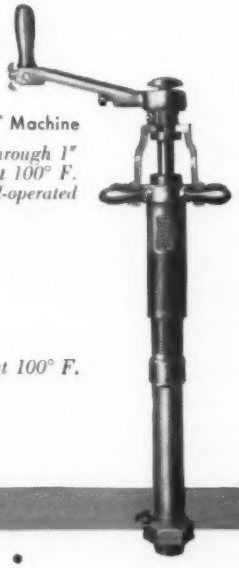
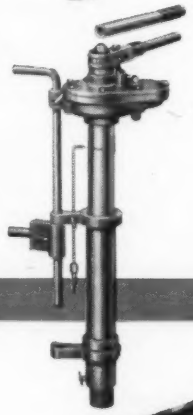


● "D-4" Machine
Drills ¼" through 2¼"
Pressures to 500 p.s.i. at 100°F.
Hand-operated



● "EH-1" Machine
Drills ¼" through 1"
Pressures to 1200 p.s.i. at 100° F.
Hand-operated



● "DH-2" Machine
Drills ¼" through 2⅛"
Pressures to 1200 p.s.i. at 100° F.
Power or hand-operated

Drill the main, insert and extract plugs or stems, recondition valve seats and make stop-offs with No-Blo fittings and these basic No-Blo machines.

All of these operations may be done under full line pressure, in complete safety, without loss or blowing of gas or interruption of other services.

Contact your Mueller Representative or write direct for your copy of the latest No-Blo booklet "Make Installations Under Pressure" — an illustrated, step-by-step story of No-Blo installations.

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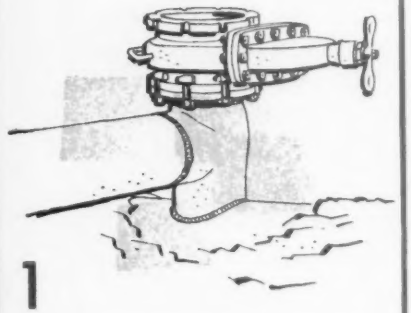
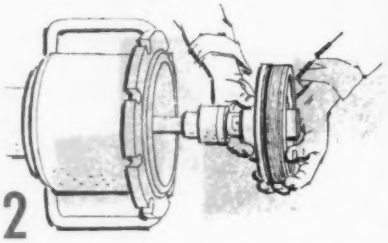


1

Weld tee to main and complete lateral to first valve. Test welds. Bolt Mueller gate valve—**hand tight**—to flange of tee. Open valve.



2

Attach completion plug and alignment tool to shaft of completion machine. Bolt completion machine—**hand tight**—to gate valve. Carefully align valve and machine with tee to permit inserting completion plug into top of tee. Tighten all bolts solidly. Mark position of completion machine on gate valve. Remove plug and machine.

3

Attach proper adapter, pilot drill and shell cutter to boring bar of Mueller C1-36 Drilling Machine. Bolt drilling machine to gate valve. Make cut into main using air motor or portable gasoline engine drive unit to power drilling machine. Retract boring bar, close valve and remove machine.

MUELLER NO-BLO® Method

BRANCH MAINS

■ *quickly* ■ *safely* ■ *under pressure*

■ A simple method of connecting large lines to an all-welded steel system is to use a Mueller Flanged Tee with a Mueller C1-36 Drilling Machine.

Contoured inlets, beveled outlets and the use of line pipe analysis steel in Flanged Tees assure fast, easy field welds. Use of the NO-BLO® Plug in top of tee makes it possible to recover the expensive valve used during installation.

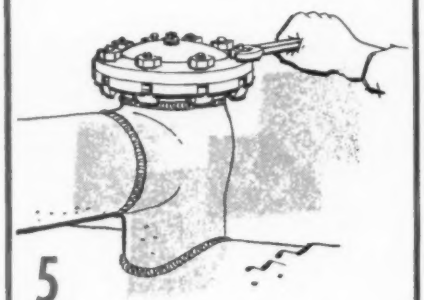
Optional power units for the C1-36 Drilling Machine give smooth, clean cuts through any size pipe.

Strong, permanent connections, with a minimum of excavating, are the result. And the entire installation is completed under pressure without escape, loss or blowing of gas or interruption of service to customers on the main.

Tees are available with 150, 300, 400 and 600 pound flanges for pressures up to 1200 p.s.i. Sizes 3″, 4″, 6″ and 8″.

4

Attach completion plug and inserting tool to shaft of completion machine. Bolt completion machine to gate valve in same position as marked. Open valve and insert plug firmly into top of tee. Test for tightness. Release plug and remove machine and gate valve. Test entire set-up with soapsuds.



5

Position gasket on flange of tee and bolt completion cap firmly in place. Lateral connection is now completed and ready for backfilling.

STOP-OFFS. Completion plug may be removed at any future time and stop-offs made by using a special stopper and NO-BLO Line Stopping Equipment.

RE-USE. Flanged Tees may easily be salvaged upon abandonment of main for re-use on other lines.

Ask your Mueller Representative or write direct for the NO-BLO Method Booklet "Make Installations Under Pressure". It shows how many gas service installations may be made in complete safety, without loss of gas or interruption of service to customers.

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LINE PRESSURE GOING UP!

MEMO
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Geo:—
Considering raising
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Better check this—
Now good up to
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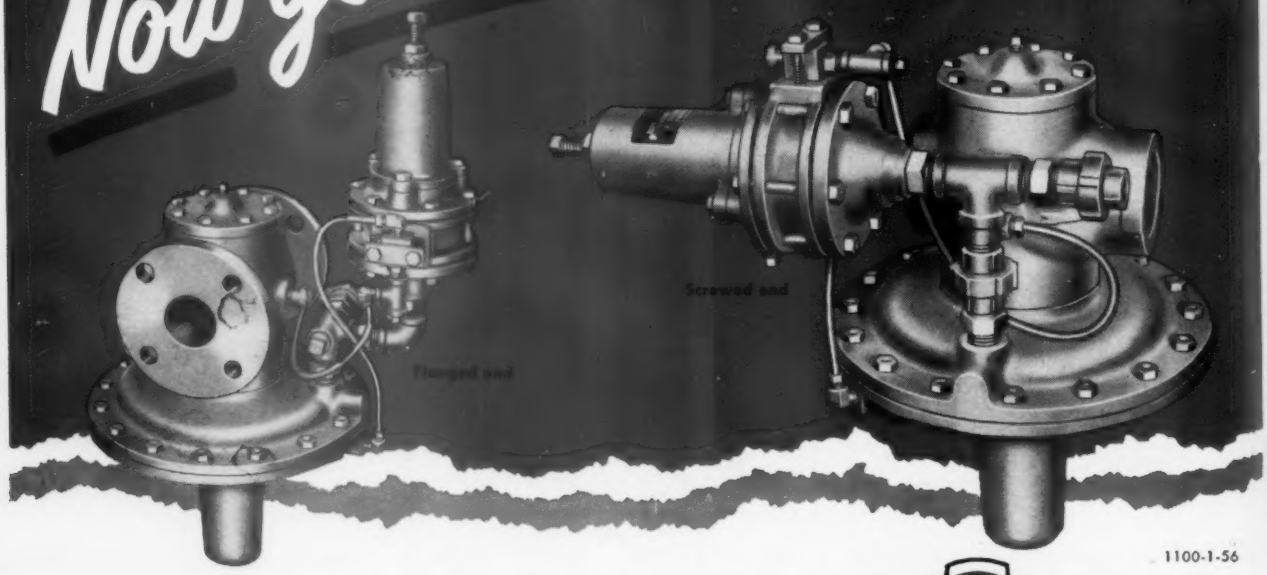
Now good up to 400 psi



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Now, more versatile than ever—good up to 400 psi. Your choice of three body assemblies—

2" flanged 250 lb.	rated for 400 psi
2" screwed end	rated for 400 psi
2" flanged 125 lb.	rated for 175 psi

All suitable for outlet pressure range from ounces to 150 psi with no change required in regulator or pilot—just change the pilot spring. It's accurate—versatile—compact! A good buy!

Why stock two, when Model '1100' will do?

And, if 400 psi is too low, why not try the all-steel Model '1200', good up to 1200 psi inlet and 600 psi outlet?

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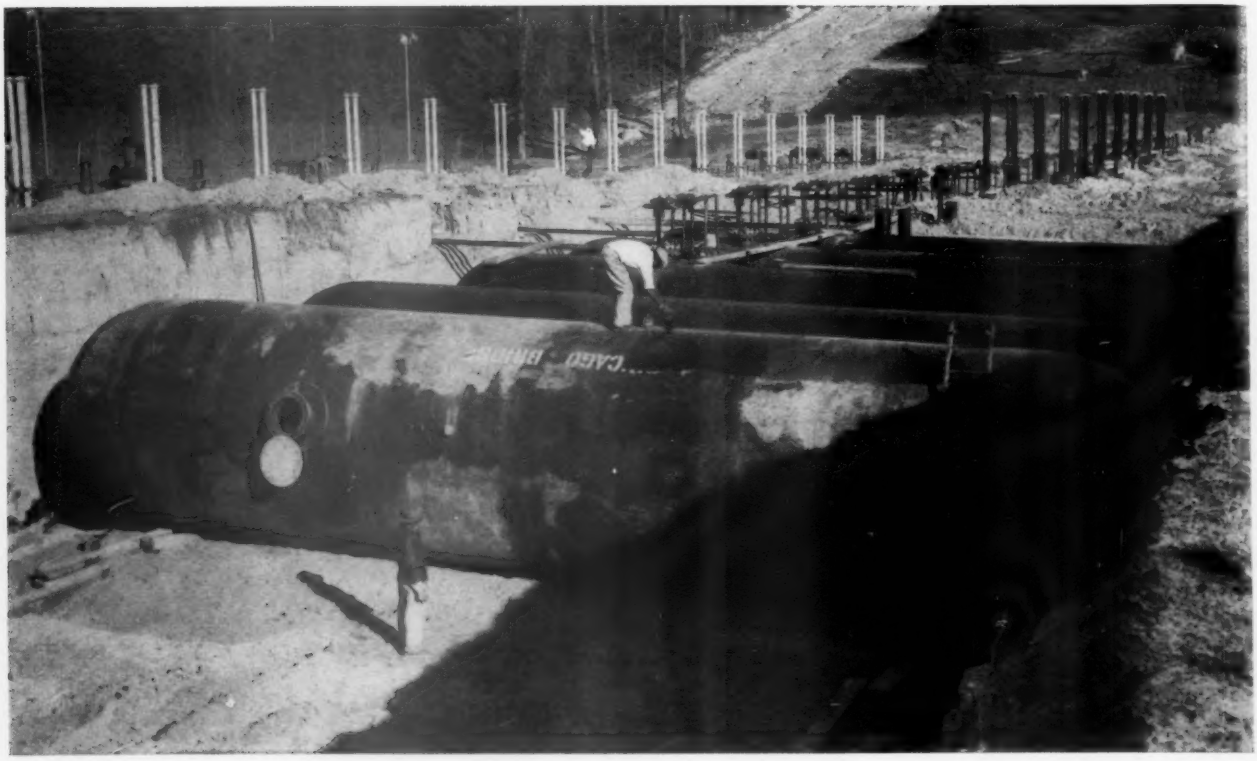
SKINNER-SEAL | **BELL JOINT CLAMP**



ATLANTA GAS LIGHT COMPANY INCREASES PROPANE STAND-BY

The 1956 addition to Atlanta Gas Light Company's liquid propane storage expansion program, which began two years ago, consisted of twenty 30,000 gallon tanks. The total stand-by propane-air capacity serving Atlanta became 2.7 million cubic feet per hour from 78 tanks like those pictured. The white stacks mark the location of 20 tanks installed during two preceding years. The 1957 expansion program will provide for 20 additional tanks at this plant and seven in other properties.

Underground protection of these tanks begins at the tank fabricating shop, where a special Royston inhibitive, insulating primer is applied. At the installation site the tanks are given a spray coat of Roskote Mastic. This is followed by a fog coat of non-conductive, contrast paint. The latter insures complete coverage of the second spray coat of Roskote Mastic, which completes the prescribed underground protection.

The Atlanta Gas Light Company has similar installations in Waycross, Macon, Valdosta, Rome and Athens.

If you are planning an underground or above ground installation of tanks, or piping, write for complete information on the Roskote time-proven, economical protective coating system.

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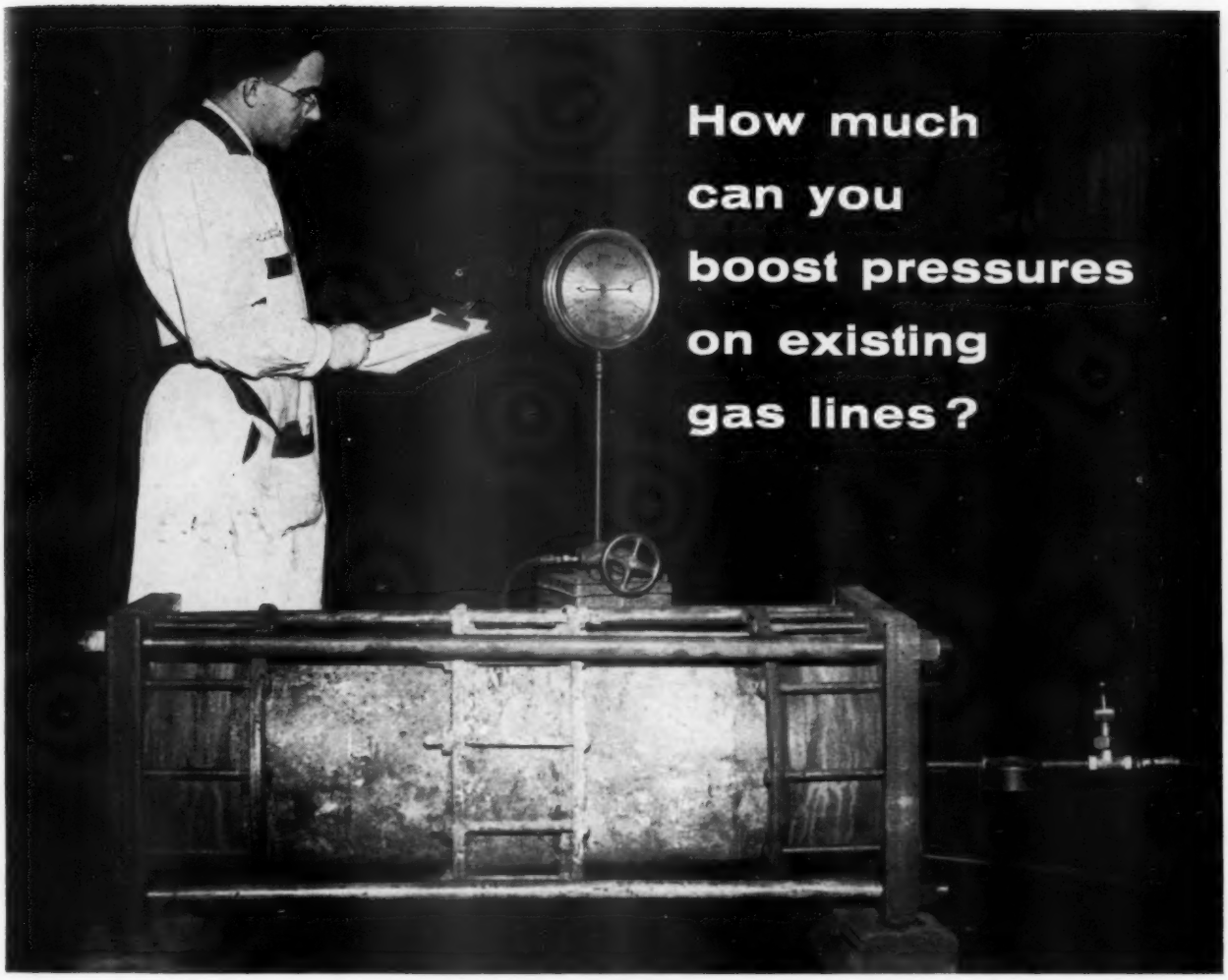
ROSKOTE

BRANCH OFFICES IN ATLANTA, CHICAGO, HOUSTON, PHILADELPHIA, SAN DIEGO AND TULSA. WAREHOUSED IN NORTHEAST, SOUTHEAST, NORTH CENTRAL AND SOUTH CENTRAL REGIONS.



After being buried underground 14 years, this style 38 Dresser Coupling was taken to a testing laboratory and subjected to 1800 psi internal hydrostatic pressure. No leaks appeared.

Here's the story of how one company was able to double pressures on an important line.

By Fred Newell, Chief Product Engineer,
Dresser Manufacturing Division

Here's how Manufacturer's Light & Heat Company, Pittsburgh, discovered it was possible to double pressure on a 14-year-old line: One of their 16″ pipelines was originally joined in 1942 with Dresser Couplings. So they asked Dresser to test two sections of pipeline prior to pressure tests on the line itself. In each instance, the sections were dug up and taken to Dresser laboratories without disturbing the 14-year-old couplings in any way. The line previously operated at a maximum of 380 psig.

Couplings tested to 1800 psi

Hydrostatic test equipment was fitted to each section and pressure tests began at zero psi. Pressures were increased in increments of 200 psi and continued up to 1800 psi without a sign of a leak at the Dresser Couplings. At this point the testing equipment reached its limit and the test was terminated.

Even with every other bolt removed, these 14-year-old Dresser Couplings took a pressure of 1375 psi without leaking.

The coupling gaskets were then checked and found to be in excellent condition. Since the couplings were expected to withstand only 600 psig for their new intended use, it was obvious that they could handle the job with plenty of extra strength to spare.

Manufacturer's Light & Heat Company then tested the line in place to 660 psig without leakage, thereby qualifying the line for 600 psig operation. Thus the time-proved dependability and sound engineering principles inherent in Dresser Couplings will provide important savings in rehabilitation costs on these lines and permit an immediate increase in gas service to Manufacturer's many gas customers in Western Pennsylvania.

Your Dresser Sales Engineer will be glad to give you further information . . . or write us direct. Dresser Manufacturing Division, Bradford, Pa. Sales Offices in: New York, Philadelphia, Chicago, San Francisco, Houston, Denver and Atlanta. In Canada: Toronto, Calgary.

ONE OF THE DRESSER INDUSTRIES

JUL 12 1957

Plastics for Repair of Mains

A SYMPOSIUM

HOW well are plastics working out in the repair of underground structures — particularly for sealing pipe joints and repairing broken mains? If the experiences of numerous companies can be taken as criteria, plastics are doing a good job.

On this and the following seven pages are reports from three companies presented at the 1957 AGA Distribution Conference in Houston, which outline three different approaches. Two of them, one in which broken mains and leaking joints are repaired, and the other in which joints in large diameter pipe are sealed internally, involve the use of epoxy resins. The third method, for internally sealing leaking mains, uses a plastic in colloidal to impregnate joint yarn and seal it tightly.

Whatever the approach, the use of plastics in distribution system maintenance and repair will continue to grow as different materials are tried out. Whenever the use of plastics can help cut maintenance and repair costs, it undoubtedly will become standard procedure to use them.

"Promising Method"

CHICAGO: External Repairs Made With Epoxy Resins

Robert J. Detlefsen, *Assistant Superintendent of Distribution*
Peoples Gas Light and Coke Company, Chicago, Illinois

FOR SEVERAL YEARS, Peoples Gas Light and Coke Company has been conducting experimental work on the use of epoxy resins as compared with other materials for the repair of underground facilities. Tests of an epoxy resin bell and spigot compound were so promising that this resin is now used for actual field repairs.

Recently, we have been testing another epoxy resin compound. The results of these tests are promising but actual field tests have not been concluded.

Advantages . . .

Our use of these epoxy resins is based on their following qualifications:

1. They have great strength and adhesion with moderate flexibility.
2. Epoxy resins when cured, are remarkably resistant to chemical attack.
3. Material costs of epoxy resins are substantially less than the costs of standard clamps or sleeves. The degree of saving, however, is dependent upon the type of repair.
4. Epoxy resins are thermosetting. Their physical structure and properties are relatively unchanged by time, heat, or pressure.

. . . and Disadvantages

Epoxy resins have the following disadvantages when comparison is made with clamps or sleeves:

1. Epoxy resins cannot be applied to a wet or oily surface; a clamp can.
2. A more thorough job of surface preparation is required when using epoxy resin. Sandblasting is recommended in order to obtain maximum adhesion of resin to metal.
3. A clamp installation has greater flexibility.
4. After application of the resin, time is required for resin to set up or cure. This usually results in slightly higher labor costs for

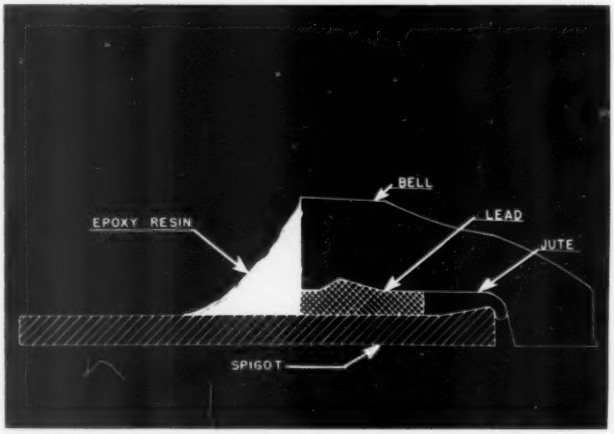


FIG. 1. Repair to a bell and spigot joint.

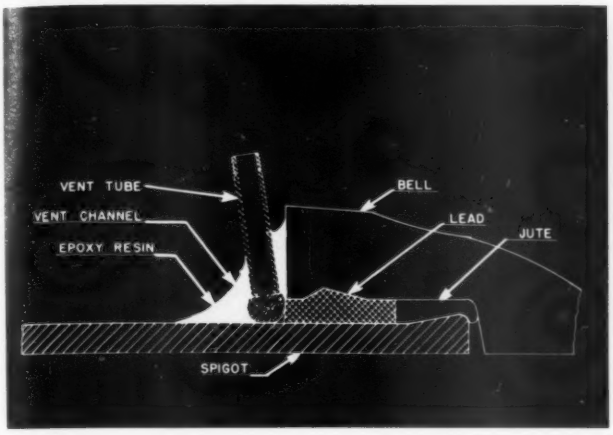


FIG. 2. Bell and spigot joint repair with vent.

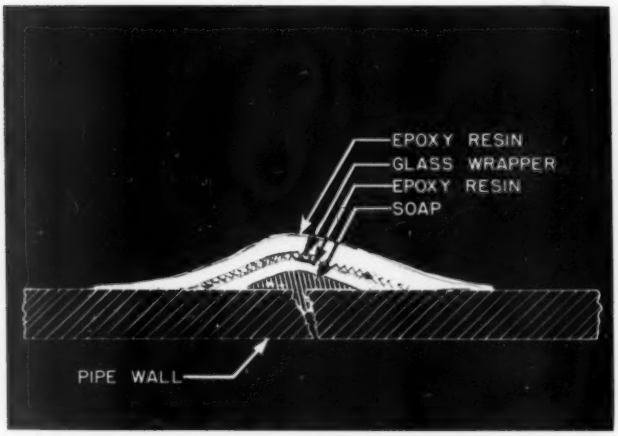


FIG. 3. Broken main repair.

an epoxy repair than for a clamp repair.

Our distribution system is composed of a low pressure and medium pressure network of mains operating at pressures of 6-in. wc and 25 psi maximum, respectively. Some arterial mains, however, operate at pressures in excess of 25 psi.

Because epoxy resins in their plastic state will not stop even a low pressure leak, it is necessary to stop the leak prior to the application of the resin or form a vent channel around the leak while the resin sets up around the channel.

Repair Methods

Basically, we have three possible methods that may be used when making an external repair:

- METHOD NO. 1 is to temporarily stop the leak by caulking, or other means, before applying the resin. This method has the disadvantage in that we are unable to test the effectiveness of the resin application.

- METHOD NO. 2 is to provide a vent channel around the leak to bleed off the gas pressure while the epoxy resin sets up around the vent channel. After the resin sets up, the vent channel is capped off and the repair can be tested under line pressure. The disadvantage of this method is the relatively long time required for the resin to completely cure.

- METHOD NO. 3 is to temporarily repair the leak by caulking, or other means, and then form a vent or test channel around the repair. The resin is applied around the test channel and after set up, the test channel is pressurized with air from an external source and the resin repair is tested.

We have not as yet standardized on any of the above methods. One reason for this is the time required for the resin to set up or cure.

Setup Time

This setup time is a function of both the ambient temperature and the surface temperature of the pipe on which the resin is to be applied. As temperature increases, set up time decreases. For example, if the temperature of the resin and activator prior to mixing is 50 F, approximately 45 minutes is required for the mixture to set up in the mixing container; if applied in a relatively thin layer, as it would be in a simple bell joint repair to 50 F main surface, approximately 7 hours are required for cure. The ability of the pipe to dissipate the heat of the exothermic reaction considerably lengthens the time of cure.

At 70 F, the resin will set up in the mixing container in 15 minutes and if applied in a thin section to a large main area having a temperature of 70 F, the cure will take place in approximately 4 hours.

During the past winter, we heated the resin and activator prior to mixing; but even with this preheat we had one repair (which took place at an ambient temperature of about 15 F) fail to effect a complete cure in 24 hours.

Even under the most favorable circumstances, it has not been possible to prepare the excavation, vent the leak, make the repair, wait for setup, pressure test the repair and backfill the opening in 8 hours. This can become an expensive operation if we utilize the vent principle and actually test the repair.

However, if we temporarily stop the leak by caulking or other means prior to applying the resin, and then do not actually test the effectiveness of the resin application, we can backfill in approximately 90 minutes. The resin sets up hard enough in this time so that we can safely backfill. The time of complete cure will be dependent only on the adjacent ground temperature because oxygen is not a requirement for cure.

Joint Repairs

Epoxy resin repairs are ideally suited to those locations where corrosion is known to be a problem, where clearance would prohibit the use of a clamp or sleeve, and the many locations (usually on fittings) where a clamp would not fit.

Fig. 1 shows a typical bell joint repair. To date we have made similar repairs on approximately 700 lead or cement joints on our low pressure system and on approximately 50 lead joints of our medium pressure system. These joints range in size from 4 to 24 in.

The procedure of repair is as follows:

1. Sandblast the joint. This provides for maximum adhesion of resin to metal.

2. If the joint is lead, stop leakage by caulking. If the joint is cement, remove the cement as necessary and stop the leakage with a quick setting (5-min) waterproof cement having a consistency capable of withstanding our low pressure.

3. Test for leakage with leak indicator or soap solution.

4. If soap solution is used, flush with clear water and dry thoroughly. Resin will not adhere to a wet, soapy or oily surface.

5. Thoroughly mix the ingredients. Faulty mixing will adversely affect cure time and strength of repair. In cold weather, preheat the ingredients in order to speed up the cure.

6. Using a putty knife, apply the

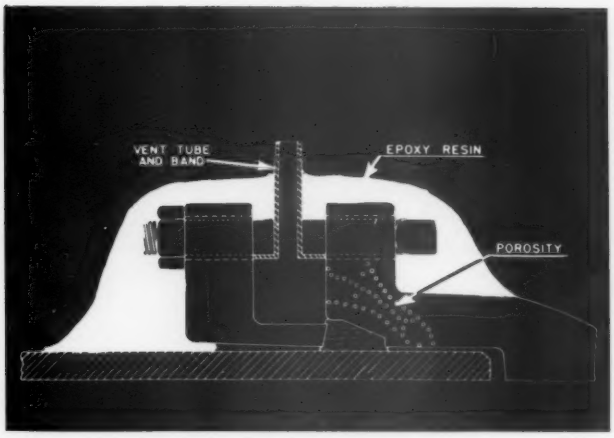


FIG. 4. Repair to mechanical joint.

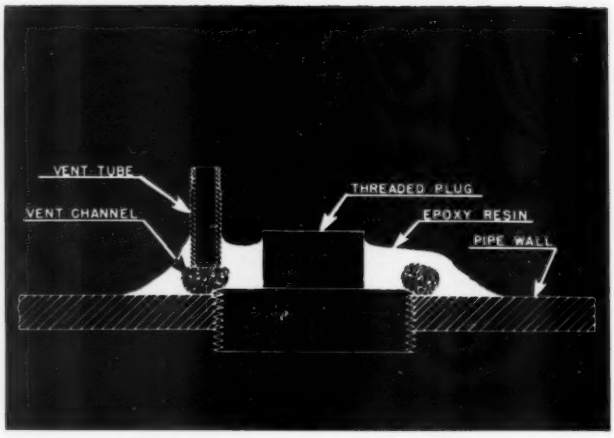


FIG. 5. Threaded connection repair.

resin in layers in order to form a substantial fillet. This reduces to a minimum the possibility of a pin hole flaw in the resin repair.

7. Cover the repair with Kraft paper. This helps to retain the heat of reaction and also provides some protection during backfill. After the repair has taken a partial set (45 min in summer and 90 min in winter) proceed with the backfill. The customary precautions observed in the backfill of coated pipe should be used.

This is the method that has been used for the majority of our bell joint epoxy resin repairs. Numerous checks have been made on these repairs; but we have found no indication of damage by backfill or indications of leakage.

There is always the possibility of a small potential leak development because of a fault in the resin application. However, all of our work to date indicates this possibility to be a very remote one.

Joint Repair With Venting

Fig. 2 illustrates another bell joint repair using the venting technique. We have made similar repairs on 75 joints ranging in size from 24 to 36-in.

The procedure here is to sandblast the repair area. It is then optional as to whether you stop the leak or not. Form a vent or test channel around the leakage area. This channel may be formed from sheet metal, a coil spring, rope, or a heavy porous cotton cord. The resin is applied in layers around the channel and allowed to set up.

After setup, and then dependent upon whether or not you had stopped the leak prior to applying the resin, the vent channel is pressurized by leakage gas or by air from an external source. After test, the vent pipe is capped, coated with resin, and the job is backfilled.

The advantage of this method is that you have actually tested the effectiveness of the resin repair. The disadvantage is the time required for the resin to completely cure.

Several of these repairs leaked on test but this was proved to have been caused by testing before the resin had completely cured.

The fact that none of these repairs would have leaked if properly cured tends to substantiate our belief that the method described in the previous slide, where no testing of the epoxy repair was done, will give satisfactory results.

Broken Main Repairs

Fig. 3 shows an example of a broken main repair. We have repaired approximately twelve 6 and 8-in. low pressure mains in this manner. Leakage is stopped by forcing soap into the break as the main is uncovered. The repair area around the break is then sandblasted. A layer of resin is applied, followed by a wrapping of glass tape. The repair is completed with another layer of resin.

Fig. 4 shows an example of repairs made to 28 mechanical joints of a 20-in. cast iron high pressure main. These joints were leaking because of porosity of the metal in the bell extending from beneath the seat of the bell and up through the vertical face of the bell above the gasket.

Using the vent technique and 21-lb of resin per joint, a cocoon was constructed over the joint from the back of the bell to the spigot piece. This made a very effective and economical repair.

Fig. 5 shows an example of repairs to thread leaks on 4-in. screw plugs in a cast iron high pressure main. The vent technique was used here.

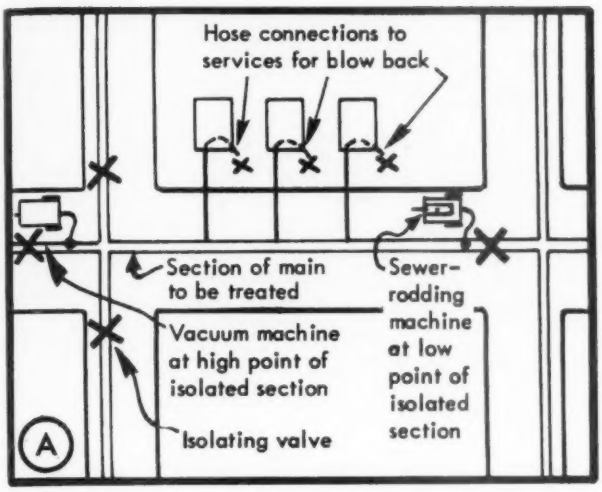
Coupling Repair

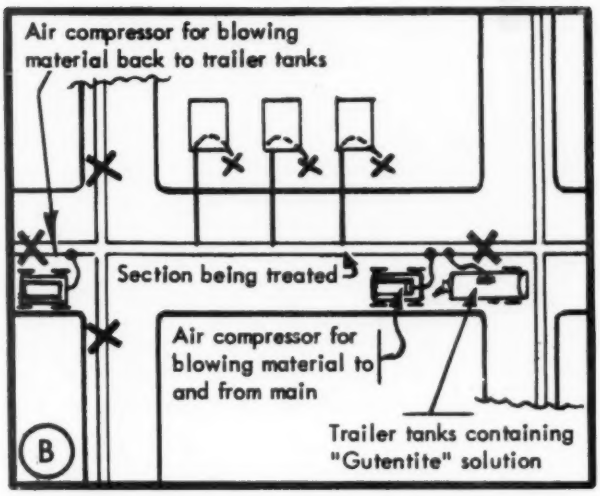
We have also repaired leaks and corrosion damage to the center rings of 24 and 48-in. medium pressure dresser couplings. Actual leakage is usually first stopped by a temporary mechanical repair. The repair and any corrosion damage is then protected by a resin application. In some instances, where we could not stop the leak by mechanical means, we used the venting technique to bleed off the pressure until the resin could set up.

Looking Ahead

We believe the future of epoxy resins, for use in gas industry repairs as described here, to be one of optimism and expansion. The chief reasons for this are its anticipated longevity and the fact that it can be used in the many locations where a mechanical clamp can not. Research and development work, however, should be directed towards:

1. **Acceleration of the curing cycle** of the epoxy resin, without loss of its existing desirable qualities. This would make it economically practical to test the effectiveness of the resin repair.
2. **Flexibility.** The epoxy resin has moderate flexibility. We need additional research in order to be sure that when the resin is applied to a series of consecutive joints that adverse rigidity will not develop.
3. **Quantity.** What is the optimum amount of resin to use for a standard repair?
4. **Internal Repairs.** We have approximately 30 miles of steel coupled 48-in. cast iron main. Leaks have been developing in the couplings. Our very limited experience with internal sealing has led us to believe that it will be the most economical method of repair.


Hose connections to services for blow back
Section of main to be treated
Sewer-rodding machine at low point of isolated section
Vacuum machine at high point of isolated section
Isolating valve
A


Air compressor for blowing material back to trailer tanks
Section being treated
Air compressor for blowing material to and from main
Trailer tanks containing "Gutentite" solution
B

"Gutentite"

MILWAUKEE: Mains Sealed Internally Under Pressure

Ellsworth Ungethuem, *Manager, Supply and Distribution Operations*
Milwaukee Gas Light Company, Milwaukee, Wisconsin

FOR OVER 100 YEARS, bell and spigot cast iron pipe has been used for distribution of gas. For over 100 years some of the bell and spigot joints have been leaking to a lesser degree than that currently experienced, but still leaking. The relatively minor leakage experienced in the past could be tolerated. But, with the introduction of dry natural gas and elevated pressures, joint leakage has been increased generally to a degree of undesirable dollar loss in gas volume and danger which should be corrected.

Several means have been employed to reduce leakage. In Milwaukee, Wisconsin, city street department employees have described leak clamp installntion on every joint as "rat-holing" the pavement. Needless to say, public opinion does not lean toward this technique and the cost is high. Other methods have not proved too successful.

A different technique has been developed that uses plastics in colloidal solution, commercially known as latices, for impregnation of yarn in the bell and spigot joints.

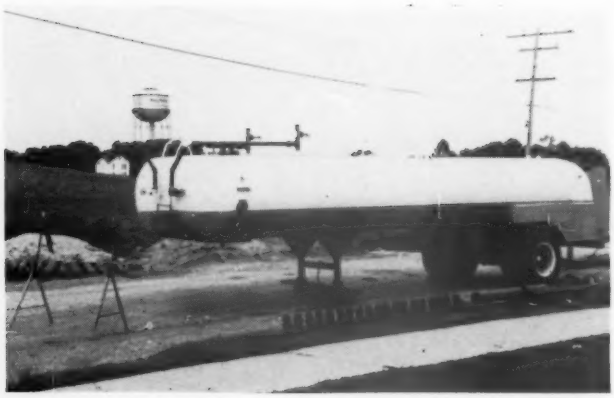
The method of application was described in the September, 1956 issue of Wisconsin Public Service Corporation magazine, CONTACT NEWS. The article is quoted as follows:

"Here is the sequence of operations required for internally treating gas joints with Gutentite:

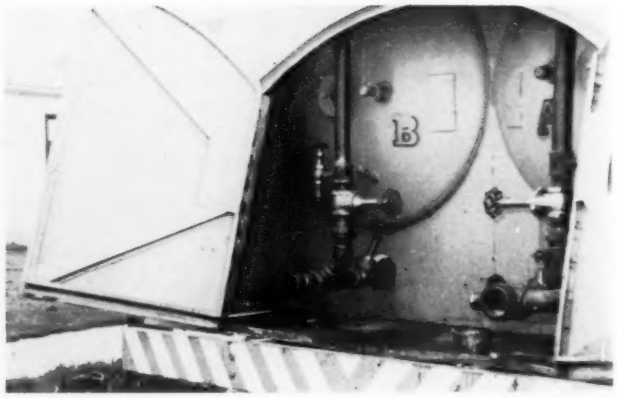
1. The main to be treated is sectionalized. The length of main treated varies with the size of the main and the amount of treating solution available.
2. All services are shut off at the riser or at the meter.
3. The main is filled with water and 20 to 30 psi is applied for 15 to 30 min to test for major main or service leaks other than joint leaks.
4. The water is then withdrawn and the main is filled with Gutentite. About 25 psi is applied for one hour.
5. Gutentite is then withdrawn from the main, and the main and services are flushed with water.
6. The second solution is introduced into the main and kept under 25 psi for approximately one hour. This is when the rubber-like compound forms.
7. The second solution is withdrawn and services and mains are flushed with water.
8. Air at about 25 psi is applied to the main for about one hour to force the rubber-like compound into the joints. Each service is blown out when this air pressure is on the main.
9. Finally, the air is shut off and the main blown down. Gas is turned on, the main and services purged, and the appliance pilots lighted."

Fig. 1, 2, and 3 indicate fixtures

Looking into opening made in the street for internal treating. The short connection on the right of the isolating valve is for injection of the liquid. Pipe leading into valve assembly on the left is used to vent air from the pipe.



One of the trailers used in the internal treatment of leaking bell joints in mains.



Back of trailer showing two solution tanks marked A and B. Air hoses and pipe connect here.

used to isolate the section of main to be treated and a trailer containing material.

Up to the present time, about three miles of mains have been treated in Milwaukee. This represents 17 different locations and mains varying in size from 4 to 20-in. I.D. An attempt, in most instances, was to stay ahead of a blacktop paving program. In Oshkosh, Wisconsin, approximately one mile of 6-in. gas main was treated.

Some observations accumulated during the application of this treatment may prove quite interesting where the total underground becomes involved rather than merely the gas main itself. In about 50 percent of the locations where connected services were an integral portion, at least 80 percent of the gas leakage was due to corroded services. Apparently, some of the high cost of maintaining underground structures is caused by repeated return trips to an area for either service replacement or joint leakage correction. To minimize this expense, it is felt that an area correction and test such as described heretofore could greatly reduce future maintenance costs or at least present a reasonable goal within the reach of sound economy.

The benefits derived from such a process beyond sealing joints are main and service cleaning where required and a complete system pressure test. Corroded and abandoned services, old lamp post connections, and other stray corroded connecting pipe will make its presence known and can thus be abandoned.

The present conception of leakage mitigation is as follows:

1. Inspection of services
   - A. Perform soil resistivity survey and examine questionable services.
   - B. From service history, inspect a qualitative sample for guidance relative to service renewals.
2. Main and service tests
   - A. Pressure test using air with rotometer or flowrater as indication of leakage from air volume loss.
   - B. Use water as a last resort to indicate location of bad services or main breaks if other methods fail.
3. Cleaning
   - A. Use vacuum blowers with necessary dust bags for dirt collection.
   - B. Use heavy duty sewer cleaner if the material in the main is in the form of a thick hard crust.
   - C. Blow services to main during vacuuming.
4. Treatment for sealing joint
   - A. Use presently devised single solution with proper pressure and time as specified for material used. Gas pressures to be carried in gas main may prescribe solution to be used.
   - B. Blow through main with discharge from vacuum blower or pull flexible witch through main catching any excess liquid at low point and return liquid to trailer.
   - C. Pressure test with air for 30 minutes.
5. Equipment
   - A. Truck fitted with outrigger, tapping equipment, Wachs saw, etc.
   - B. Trailer for single solution with meter and proper piping.
   - C. Vacuum equipment as indicated above.
   - D. Isolating fixtures and service hoses.
   - E. Digger and air compressors as required.
6. Manpower
   - A. One or two trained crews working under one foreman. A crew should consist of two compressor operators.
   - B. A fitter, machine operator and two laborers should work between and ahead of the two-man crews.
   - C. Servicemen with appliance shut-off and turn-on as required.

From current research, it is apparent that there will be changes from time to time in materials. Improvements in plastics are a continuing feature and should be recognized, but a change to another material must always bear careful investigation. This development work has opened a large field of study which is time-consuming and very nearly endless.

The work accomplished during 1956, both in Milwaukee and Oshkosh, indicates that a range of 95 to 100 percent correction was realized. This substantiates the findings of our research. It further indicates that the techniques of development and research are practicable, and that interpretations of results have been correlated in the larger scale field applications.

It is suggested that, in addition to crisis application, a section or sections be treated in order to price this treatment properly. A much better organized effort can be displayed in an area by moving from block to block in succession and a more conclusive overall pattern can thus be established. It has been noted that when one street is sealed, gas from intersecting streets moves into the already sealed section and complicates the resulting data. Treatment of areas would eliminate this possibility.

"Gutentite," by way of explanation, is a colloquialism typical of Milwaukee. Since the English spoken in this locality, in some instances, varies from that found in the dictionary, may we add that "Gutentite" means good and tight.

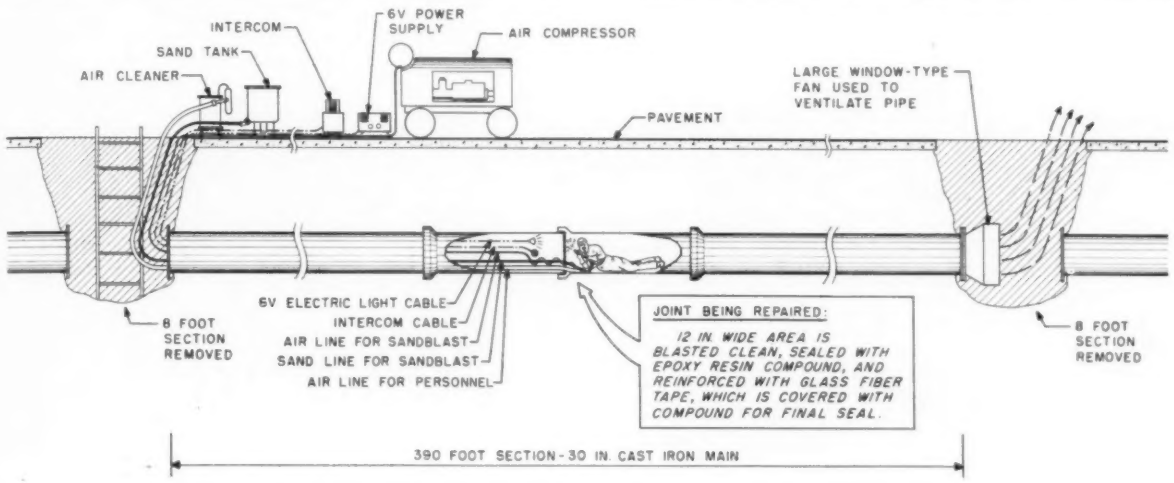

INTERCOM
6V POWER SUPPLY
AIR COMPRESSOR
SAND TANK
AIR CLEANER
LARGE WINDOW-TYPE FAN USED TO VENTILATE PIPE
PAVEMENT
6V ELECTRIC LIGHT CABLE
INTERCOM CABLE
AIR LINE FOR SANDBLAST
SAND LINE FOR SANDBLAST
AIR LINE FOR PERSONNEL
8 FOOT SECTION REMOVED
JOINT BEING REPAIRED:
12 IN. WIDE AREA IS BLASTED CLEAN, SEALED WITH EPOXY RESIN COMPOUND, AND REINFORCED WITH GLASS FIBER TAPE, WHICH IS COVERED WITH COMPOUND FOR FINAL SEAL.
8 FOOT SECTION REMOVED
390 FOOT SECTION - 30 IN. CAST IRON MAIN

Diagram illustrates procedure used in internally coating the 390-ft section of 30-in. main.

"The Inside Story"

NEW ORLEANS: Joints Coated From Interior

Hugh M. Blain, *Superintendent of Distribution, New Orleans Public Service, Inc., New Orleans, Louisiana*

PREVENTING and eliminating gas leakage by internal coating of the joints of large diameter piping has been successfully accomplished by the gas department of New Orleans Public Service, Inc. with the coating of 34 joints in a 30-in. cast iron utilization pressure main on South Claiborne Avenue between Jackson Avenue and Josephine Street in New Orleans.

In the block selected for the operation, there was a minimum of service and lateral mains, and the conditions for the test were ideal. In all, the use of internal coating eliminated the necessity for cutting holes 5-ft square and several feet deep at 12-ft intervals. This helped materially to practically eliminate interference with traffic on this busy street. The job was completed in nine working days.

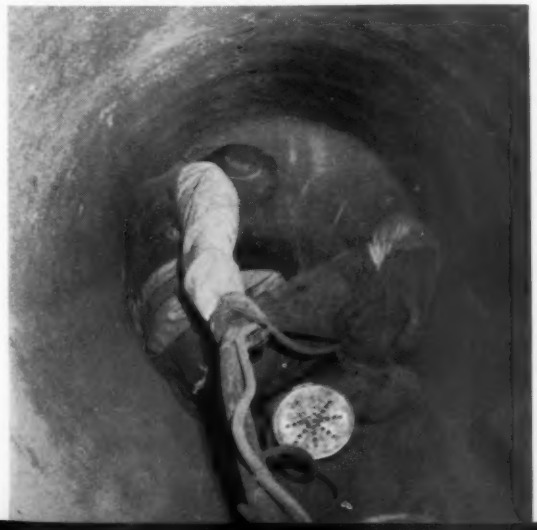
Much of the special equipment used in the company's underground section was built in its shops section. The manner in which the special equipment was used is shown in the various photographs.

There were two distinct phases of work at each of the 34 joints.

First, the joint had to be cleaned and prepared for coating.

Second, the coating used to seal each joint had to be applied. The material used was a glass reinforced epoxy resin.

Close-up of a sand blast operator crawling through the main and pulling the hoses required for this operation behind him. Round object near the man's foot is the intercom speaker.



Here's how the job looked at street level.

The Inside Story

With cool air flowing through his mask, workman stands beside tank containing the sand used to blast the pipe joints clean. The inlet hose with regulator is attached to his belt.

Ventilating air for the pipe was furnished by a window-type fan (below). It was used first at one end of the pipe and then the other since only half of the main was worked on at a time, from the middle back.

Intercom equipment was used to keep in constant communication with the workers in the pipe. Transformer box at right provided 6-v for the lighting system inside the pipe to prevent possible serious electric shock.

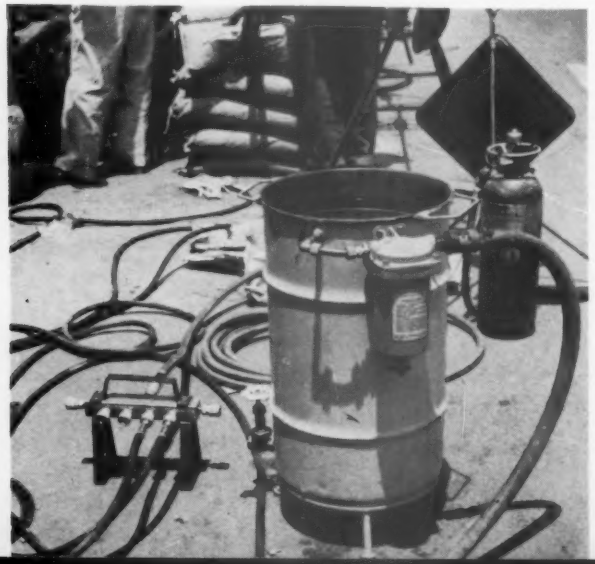
Briefly, the following procedure was used:

A hole was cut in the street at each end of the 390-ft section of the 30-in. main. At these two end locations, an 8-ft section of the pipe was cut out. The gas in the main was then purged out with carbon dioxide, and the line was aired with a large window type fan.

Men working in the pipe wore masks to which cooled air was supplied. In addition, a constant current of cool air was maintained in the pipe by the large window fan. The work was performed from the center of the pipe to each end, with the fan being moved to the proper end as needed.

Sediment was scraped from the bottom of the main, then the sand blasting of a 12-in. wide area around each joint was completed. This part of the cleaning operation was performed safely and without incident by a contractor.

Cooling tank was used to cool the air going to the masks of workers. Air from the compressors was filtered and regulated then passed through the cooling coil prior to going to the distribution manifold to be used as needed.



"Men from Mars" apply internal coating to one of the joints in the 30-in. main. Here the glass tape is being cemented in place prior to being coated with more compound.

Filled sand dolly is drawn out of one end of the main. Notice rope connected to far end of dolly which goes through the main so that the dolly can be pulled back into the main for refilling.

Special equipment used inside the pipe included a skid for removal of sand during sand blasting operation and wheeled dolly to transport workers into main. Dolly had ropes tied to each end and could be drawn from either entrance in case of emergency.

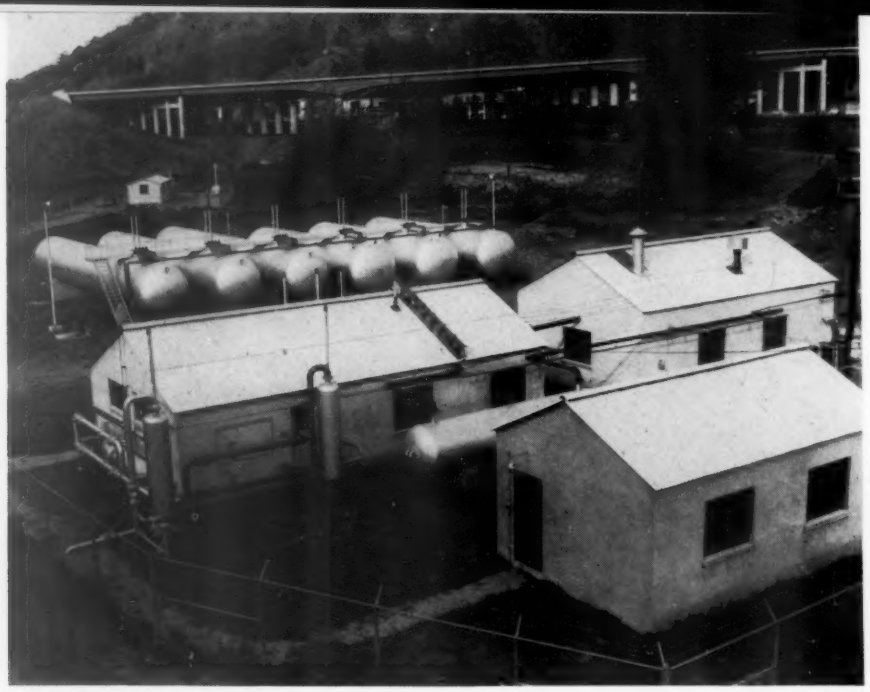
It was cooler and more comfortable inside the pipe than it was at ground level in the hot sun. An intercom system was used for constant communication, and the operator carried a safe low-voltage light.

The cleaning operation using the sandblast was performed by one man and took approximately 10 minutes per joint. After the joints were perfectly clean, an epoxy resin sealing compound was applied to each joint. A glass tape reinforcement was then applied over the compound at each joint and the tape was also covered with compound to complete the operation.

The compound was applied with a putty knife and hardened in about an hour's time. The material had to be kept cool to avoid premature hardening. The complete coating job at each joint was performed by two men and took 15 minutes per joint. * * *

Three photo sequence shows the steps involved in repairing the 30-in. main. Pipe shown is one of two 8-ft sections removed so men could get into main. Photo, left above, shows main just after it was removed from street. Sediment accumulation can be seen on walls of main. Right above photo shows pipe after being sand blasted. Below shows the completed job — a seam that has been treated with sealing compound.

Worker cleans joint by sand blasting prior to the sealing job. Here a worker is pictured ready to enter main fully equipped with hood, sand-blast hose, and speaker. ←



Aerial view of modern LP-gas standby plant that incorporates the various safety features outlined in National Fire Protection Association Bulletin No. 59.

Safe Operation of Standby LP-Gas Plants

Increased use of standby LP-gas plants for peak shaving or emergency use requires that operating personnel are informed of the inherent hazards and safe practices required for this type of installation

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IN order to develop safe practices in storing, handling, and using LP-gases, it is essential that gas operating people first be well acquainted with their physical properties. The first property of interest is that of flammabilities.

These figures tell a very interesting story. The lower limit represents the minimum percentage of gas in air that will support combustion, while the upper limit represents the point beyond which the gas-air mixture will not burn. It will be noted in the table that the smallest spreads between the upper and lower limits of flammability are for butane and propane. Compare this with the spreads of the flammable range for natural gas, coal gas, carbureted water gas, carbon monoxide, and hydrogen, and it is obvious that the flammability range of liquefied petroleum gas is narrower than for other commercial fuel gases.

LP-gases are gaseous at normal atmospheric temperatures and pressures, but are readily liquefiable by application of moderate pressure for ease of handling. As a liquid, one of its most important physical properties is its vapor pressure. If the vapors above the liquid are in equilibrium with the liquids, the pressure in a container — i.e., the vapor pressure — will vary directly with the temperature of the liquid.

It has been established that under normal storage conditions in large containers the liquid temperature will never exceed 100 F; consequently, the vapor pressure of the liquid at this temperature is used as the maximum working pressure in the design of containers. The vapor pressure of pure propane is only 174 psig at 100 F; propane from refiners, however, will contain varying amounts of propylene, which has a vapor pressure of 213 psig at 100 F. The new Natural Gasoline Association of America specifications for commercial propane limit its vapor pressure to 210 psig at 100 F.

The propane storage containers are designed for a working pressure of 250 psi with a 4 to 1 factor of safety of a 1000 psi bursting pressure. Some containers have a designed working pressure of 200 psi but they have a 5 to 1 factor of safety and, therefore, the same bursting pressure of 1000 psi.

Typical Hazards

Having knowledge of LP-gas properties, what are the typical hazards which are present in a utility plant operation? Some are:

Ignition by static electricity,

Collection of gases in pits and depressions,

Improper filling of storage containers,

Freezing effect of liquid LP-gas on the human body, and

The general danger of use of improperly trained personnel.

Static electrical charges are most commonly produced by friction or by successive contacts of unlike surfaces, one of which is usually an insulator.

Such an operation, if continued sufficiently, may accumulate more and more charge until the mutual repulsion of these charges exceeds the insulating ability of the surrounding air and the charge equalizes with a spark.

Such charges may accumulate in various ways in an LPG plant. At low humidities, a person walking across an insulated floor covering may accumulate a static charge sufficient to release from a finger a spark intense enough to ignite gas. Volatile combustibles such as gasoline, propane, or ether, in vapor mixture with air, can be ignited by a static charge generated by an individual rising from a chair. Many fires have been caused by the filtering of gasoline through chamois skin, which causes a marked separation of electrical charges. Spray painting, the flow of propane from tank truck through hoses, wet steam jetting, and sand blasting produce many static charges. Belts driving machinery may also accumulate dangerous charges.

Such static electricity hazards can be minimized or completely overcome by bonding electrically the receptacle and nozzle from which the material is separated to the surface upon which the material is discharged together with the electrical grounding of both. For moving belts, static collectors may be used. In the case of individuals, there is ordinarily sufficient leakage to drain off the charges before they become dangerous, but this is not always true.

When working in atmospheres containing LP-gases, the floor covering should be conductive and grounded and the shoes should be of somewhat low resistance. Special soles or a conduction peg in the sole that touches the floor may be used. Too low a resistance, however, may be dangerous if the worker is exposed to 110-v electrical potential, especially if the hands are wet. Many plants prescribe sparkproof tools be used in areas containing gas and when electric welding equipment must be used, the ground connection should be attached to the sections to be welded and not to adjacent ironwork.

MAXIMUM PERMITTED FILLING DENSITY

Specific Gravity at 60 F	Aboveground Containers	Underground Containers
.473 — .480	41%	42%
.481 — .488	42	43
.489 — .495	43	44
.496 — .503	44	45
.504 — .510	45	46
.511 — .519	46	47
.520 — .527	47	48
.528 — .536	48	49
.537 — .544	49	50
.545 — .552	50	51
.553 — .560	51	52
.561 — .568	52	53
.569 — .576	53	54
.577 — .584	54	55
.585 — .592	55	56
.593 — .600	56	57
.601 — .608	57	58
.609 — .617	58	59
.618 — .626	59	60
.627 — .634	60	61

Accumulations of Gas

Another hazard that a plant operator should be well warned about is the gathering of the heavier-than-air LP-gases in pits or other depressions having no ventilation. These gases will gather like water and lie in unventilated rooms or valve pits indefinitely. The use of pits containing valves, piping connections or other plant facilities should not be considered and plant rooms containing high pressure LP-gas piping should incorporate forced ventilation, preferably drawing air from the floor level.

LIMITS OF FLAMMABILITY
(Percent Gas in Air)

Gas	Lower Limit	Upper Limit	Spread
Methane	5.0	15.0	10.0
Ethane	3.2	12.5	9.3
Butane	1.9	8.4	6.5
Propane	2.4	9.5	7.1
Acetylene	2.0	80.0	78.0
Natural Gas	4.8	14.6	9.8
Coal Gas	5.6	30.8	25.2
Carbureted Water Gas	6.4	37.7	31.3
Carbon Monoxide	12.5	74.2	61.7
Hydrogen	4.0	74.2	70.2

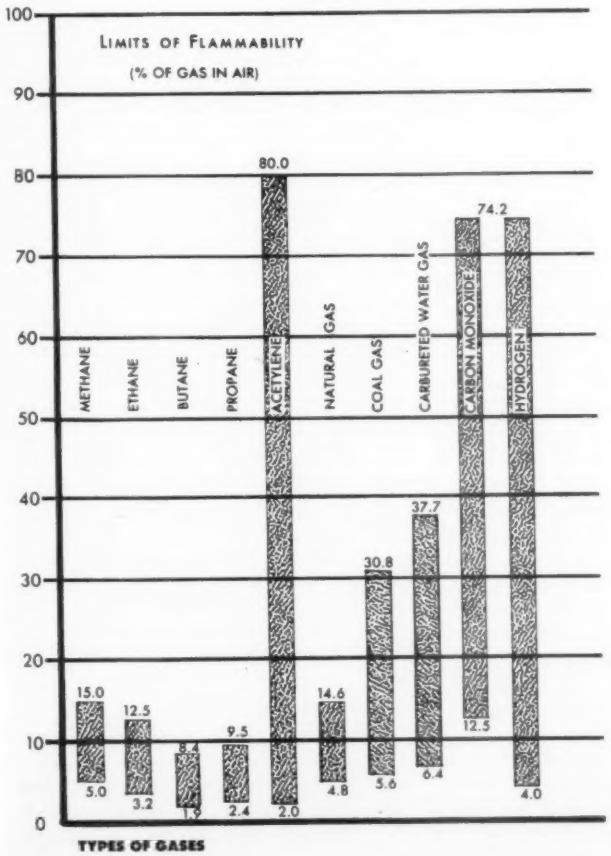
Improper Filling of Tanks

Some plant operators, not fully realizing the higher coefficient of expansion of liquefied LP-gases, have filled storage tanks too full. All tanks should have liquid level gaging devices that should be used on all filling operations. Whereas a storage tank may be filled to 95 percent of its volume, with a liquid, where temperature is 60 F in the spring of the year, pressure relief valves on the tanks will blow dangerous quantities of liquid and gas in the storage area when 100 F weather arrives. To guard against such occurrences, the Filling Density Table reproduced here, taken from page 10 of the NFPA pamphlet 59)* should be strictly followed. This means that the standard 30,000-gal propane storage tank containing propane of specific gravity of 0.510 could be safely filled with 26,470 gal at 60 F or approximately 88 percent full.

Properly Trained Personnel

The greatest hazard, however, in an LPG plant is an improperly trained employee. Like most other types of plant operations, misinformation and insufficient information can and does create dangerous circumstances.

It has been my experience that younger men with some degree of for-



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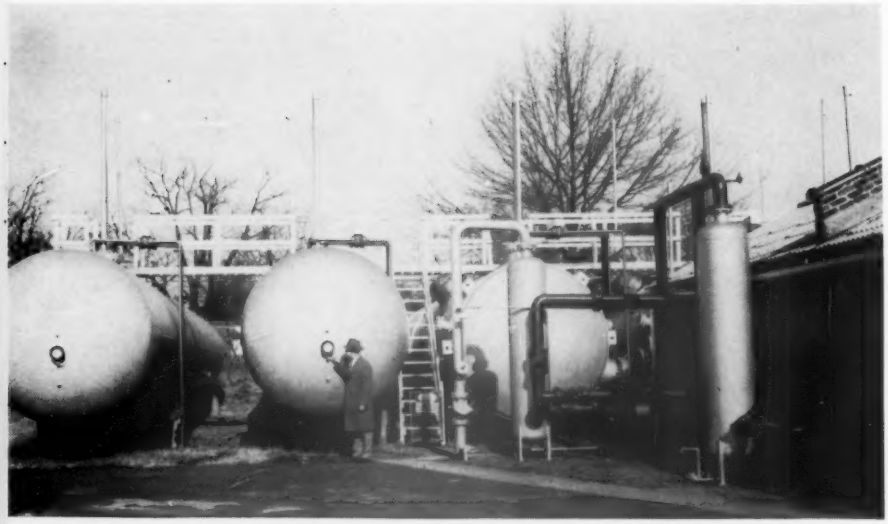

Older LP-gas standby plant includes riveted storage tank, other less desirable features. Note flammable grass and weeds around storage tanks, which violate recommended practices of Bulletin No. 59.

mal education in the basic sciences and no gas plant experience make the safest plant operators. These employees with less preconception appear to carry on more logically various tasks of tank and truck unloading, liquid transfer, and gaging tanks. Such men will start fluid flows through a plant system by thinking rather than by carrying on by memory or a procedure.

Good Plant Design

I should like to review what appears to me certain outstanding features of good design that have developed in the recent past, notably since the Warren disaster at Port Newark on July 7, 1951. Storage tanks themselves should be constructed in accordance with either the ASME or the API-ASME Unfired Pressure Vessel Code.

Experience has shown that if a proper code tank is used, and if adequate relief valves are provided, the tank may be considered the safest part of the plant. Relief valves used are spring-loaded and serve to relieve internal pressure in case of an exterior fire in two ways.

The valves first permit the gas to escape, which in itself tends to lower tank pressure; second, the escaping gas has a refrigerating effect due to the rapid vaporization of liquid which in turn cools the liquid and causes the vapor pressure to drop. When the container pressure is reduced below the set pressure of the relief valve, the valve automatically closes.

Good design is evident when one sees most LP-gas containers supported by two concrete piers placed near the ends of the tanks. Good engineering enters into the manner of supporting a tank, for it has been found that when more than two piers are had, usually two piers offer all the support which then actually introduces dangerously high stresses in tank shells.

Further protection of the LP-gas system is provided by the use of excess flow valves in all openings from a container except the relief valve, liquid level gaging device, and pressure gage. An excess flow valve is a slug type valve that is held in the open position by the action of a spring. When the pressure drop across the plunger is such that the flow required to close the excess flow valve is less than the capacity of the line in which it is installed — so that if the line downstream is ruptured — the excess flow valve will close, preventing the loss of the container's contents.

To open an excess flow valve that has closed, it is necessary to close a shut-off valve in the piping on the outlet side of the excess flow valve. A very small hole in the plunger permits a slight leakage of LP-gas through the valve into the line. When the pressure builds up in the line the spring tension on the plunger will cause the excess flow valve to open. It then remains open until there is a rupture in the line or too rapid withdrawal is made. The valve must be properly sized to keep it from prematurely closing and yet cause it to close when required.

Relief valves contain provision for moisture drainage so that ice will not form on the valve and prevent its operation. To prevent the possibility of flames damaging flanges or gaskets near these valves in case of fire and accompanying valve operation, drain piping should be installed from valve flanges to a safe exit point below the valve level.

Spacing of Tanks

Spacing requirements of LP-gas storage is another very important safety feature in plant design. The placing of a tank at least 50 ft from other tanks, buildings, property lines, and railroad spurs is not to protect other buildings built on adjacent property but rather to protect LP-tanks if other buildings caught fire.

In utility plants, groups of tanks having capacities of 2000 gal or more water capacity are installed with at least 5 ft clearance between tanks to facilitate inspection and ease in painting.

Buried Tanks

Much has been said concerning the safety aspects of buried tanks. This idea largely arose after the Newark fire. While attempting to make a tank installation safer, certain other conditions arise which make it questionable whether the tank is more safely installed. The biggest disadvantage to buried tanks is the inability to inspect the tank exterior to check corrosion conditions. No large tank can be completely coated and buried without damage to the coating during installation. Much the same may be said for aboveground insulated tanks since water gets under the insulation and causes corrosion in the best of insulation jobs.

Odorization

Odorization is a consideration in propane handling as necessary as that given in the distribution of natural gas. LP-gases as supplied by producers will contain a pound of a mercaptan type odorant per 10,000-gal. This is standard practice unless specifically ordered otherwise by the purchaser. Generally this concentration is sufficient to detect LP-gases when in mixture of 0.5 percent or more in air; however, LP-gases so odorized and in storage for six months or more have been observed to lose some odorant effect. It is felt good practice to reodorize in utility plant storage when kept for long periods.

Caution is also necessary when odorized LP-gases are mixed with air and used as a natural gas substitute. Reports have in some cases indicated lack of sufficient odorization due to odorant deterioration in presence of oxygen. It is well to check such sendout gases periodically with an odorometer or other acceptable means to be safe.

Acknowledgment

This article was developed from a talk given at the New England Gas Association's Thirteenth Annual Safety Conference, Boston, Massachusetts, 1956.

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